

EVALUATION REPORT OF THE UNIT INPHYNI – Institut de Physique de Nice

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:

Université Côte d'Azur – UCA,

Centre national de la recherche scientifique –
CNRS

EVALUATION CAMPAIGN 2022–2023
GROUP C



In the name of the expert committee¹:

Barend VAN TIGGELEN, Chairman of the committee

For the Hcéres ²:

Stéphane Le Bouler, acting president

En vertu du décret n° 2021-1536 du 29 novembre 2021 :

1 Les rapports d'évaluation «sont signés par le président du comité». (Article 11, alinéa 2) ;

2 Le président du Hcéres «contresigne les rapports d'évaluation établis par les comités d'experts et signés par leur président.» (Article 8, alinéa 5).

This report is the result of the unit's evaluation by the expert committee, the composition of which is specified below. The appreciations it contains are the expression of the independent and collegial deliberation of this committee. The numbers in this report are the certified exact data extracted from the deposited files by the supervising body on behalf of the unit.

This version of the report is confidential under the Decree n° 2021-1537 of 29 November 2021. The parts considered confidential and the responses to the concerns raised by the supervisory bodies will not be included in the public version of the report available on the Hcéres website.

MEMBERS OF THE EXPERT COMMITTEE

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HCÉRES REPRESENTATIVE

Mme Laurence Pruvost

CHARACTERISATION OF THE UNIT

- Nom : Institut de Physique de Nice
- Acronyme : INPHYNI
- Label et numéro : UMR 7010
- Nombre d'équipes : 11
- Composition de l'équipe de direction : M. Guillaume HUYET

SCIENTIFIC PANELS OF THE UNIT

ST Sciences and technologies

ST2 Physics

THEMES OF THE UNIT

The research unit INPHYNI comprises 11 teams that are regrouped thematically into 3 major axes, with a more or less equal number of permanent members (counted in Equivalent Temps Plein Recherche ETPR), and among which 5 are located on the Sophia-Antipolis campus (the former INLN building) and 6 on the Valrose campus (former LPMC). All axes have theoretical, experimental, numerical and applied activities. Two technological platforms exist (Optics & Photonics and Soft Matter) that are shared among several teams, four technical support units (electronics, mechanics, chemistry and computers & network) as well as one administrative desk comprising seven IT. A scientific council exists made up of direction and team leaders, and a special council that follows closely the construction of the new premises in La Plaine du Var.

Inside the axis Waves & Quantum Mechanics, team 1 (theoretical physics) works on quantum fluids of light, correlated quantum systems, neural quantum networks, QCD, general relativity, and 1D cold atoms and quantum transport. Team 2 (Waves in Complex media) has both theoretical and experimental activities on topological photonics, and several aspects of (microwave) light-matter interaction. Team 3 (cold atoms) is mainly experimental and studies several aspects with cold Rubidium, light localisation in cold Ytterbium gas, hot quantum fluids of light, and the measurement of intensity fluctuations applied to stellar interferometry.

The Photonic axis contains three teams with activities that go from fundamental physics to very applied engineering. Team 4 (Fibers Optics and Applications) studies the influence of nanoparticles in fibers, the application of optical fibers as probes for radioactivity, nuclear damage, chemical pollutants and as temperature sensors. Team 5 (Quantum Photonics and Information) implements quantum entanglement of light in various applications such as the quantum, secured fiber communication between 3 remote stations in the Côte d'Azur in collaboration with the Orange Corporation. Finally, Team 6 (Complex Photonic Systems & Materials) seeks new optical components for applications in (bio-, medical-) imaging and integrated optics.

The axis on Non-linear Physics, Complex Fluids and Biophysics houses 5 teams with many different activities, closely related and sometimes slightly overlapping. Team 7 (MIMIC: Microfluidics and interfaces in Physical Chemistry and Biology) works on liquid interfaces, flow of biofilms of bacteria, micro-swimmers in plants, and the modelling of a 3D robot fish, developed by Team 10. Team 8 (Rheology of Concentrated Suspensions) has numerical and experimental activities on a variety of concentrated non-Brownian suspensions. They have studied the role of direct inter-particle contacts, particle-stiffness, jamming and long-range hydrodynamic interactions in shear viscosity. Team 9 (Magneto-Rheology and Nanomaterials) studies mostly magnetic nanocomposites and the magneto-rheology of suspensions under shear, with clear emphasis on applications in industry and technology. Team 10 (Complex Fluids) investigates instabilities and non-linearities at interfaces, wetting dynamics and droplet condensation, the flow of granular matter, the propulsion of soft elastic objects and robotic fish locomotion. Finally, Team 11 (Non-linear and Out-of-Equilibrium Physics) comprises many different topics, such as wave turbulence, turbulent transport of fungi spores, modelling of enzyme regulation, solitons in semi-conductor lasers, and the self-organisation of quantum dots on surfaces.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

INPHYNI is a joint research unit with Université Côte d'Azur (UCA) and CNRS as scientific authorities. It was created in 2017 by merging the Institut Non Linéaire de Nice (INLN, created in 1991, premises owned by CNRS) on the techno-Campus Sophia Antipolis, and the Laboratoire de Physique de la Matière Condensée (LPMC, created in 1973, premises owned by UCA) on the Valrose Campus of UCA. The present director was appointed by the authorities in 2017 after an external search and a positive vote of the laboratory council (defined at that time as the sum of the councils of INLN and LPMC). The unit is still divided between the two widely separated sites. In 2017, it was already decided by UCA and CNRS that a single site should become available, with UCA as host. This site was finally chosen at the Plaine du Var, with good connexion to airport and direct access to a new tramway line. With delays caused directly and indirectly by COVID, the move will finally take place in march 2023. At the time of writing, the mechanics service (technical support) had already moved over.

RESEARCH ENVIRONMENT OF THE UNIT

The current position of the research unit within the strongly transformed scientific landscape of Nice is an important issue. Undoubtedly, it is simply too early to tell and the present analysis is just a snapshot. A major and highly successful reorganisation has taken place during the last term by the award of the IDEX UCA JEDI. This high-quality PIA project was led by the former director of INLN and currently member of Team 1. The University Nice Sophia-Antipolis disappeared in 2020 and Université Côte d'Azur (UCA) was created. The consortium IDEX UCAJEDI has as partners all major scientific protagonists in the Nice area: UCA, CNRS, Inria, INRAe, IRD, INSERM, Observatoire de la Côte d'Azur, CHU Nice, and a few smaller establishments, but not CEA Tech in Région Sud. UCA JEDI created five Academies of Excellence whose role is to foster transverse projects, among which the one on 'Complex Systems', which covers most of the activities of INPHYNI. Several 'Ecoles Universitaires de Recherche' (EUR) have been created that act as (multi) disciplinary faculties and that constitute the major communication channels of research units with UCAJEDI. INPHYNI is mainly involved in the EUR SPECTRUM, currently directed by an INPHYNI member (and somewhat less in EUR LIFE and EUR DS4H on Digital Systems). SPECTRUM organises training through research inside UCAJEDI on mathematics, physics, astrophysics and geophysics, chemistry and engineering, while fostering interdisciplinarity. The EUR SPECTRUM and the Doctoral School SFA (Sciences Fondamentales et Appliquées) coexist individually (for the moment) but their actions are synchronised as much as possible. INPHYNI takes part in an EQUIPEX project on fiber structuration using laser writing. UCA and CNRS have launched Junior Chairs of Excellence (Chairs Professeurs Junior : CPJ) to foster innovative and predefined scientific operations and also to cope with 'repyramidage', i.e. to create a more favourable distribution of ages among the researchers. INPHYNI participates in several national PEPR (programmes et équipement prioritaires de recherche), such as the ones on 'Quantum Technologies' and 'Electroniques' that are led by CNRS, CEA and Inria.

INPHYNI and CHREA (CNRS UPR unit in Valbonne working on the epitaxy of semi-conductors) are the only two research units attached to CNRS Institut de Physique in the Nice – Sophia-Antipolis agglomeration. The research federation DOEBLIN (UCA/CNRS/OCA/Mines Paris-Tech) still exists despite the creation of the Academy with similar challenges. Both foster interdisciplinarity between the many other units involved in physics and mathematics (ARTEMIS, CEMEF, CRHEA, GEOAZUR, INPHYNI, LAGRANGE and the LJAD). The unit INPHYNI is involved in Fédération Claude Lalanne and is very active in many national CNRS research groups (GDR).

UNIT WORKFORCE: in physical persons at 31/12/2021

Permanent personnel in active employment	
Professors and associate professors	15
Lecturer and associate lecturer	30
Senior scientist (Directeur de recherche, DR) and associate	13
Scientist (Chargé de recherche, CR) and associate	13
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	23
Subtotal permanent personnel in active employment	94
Non-permanent teacher-researchers, researchers and associates	49
Non-permanent research supporting personnel (PAR)	2
Post-docs	9
PhD Students	45
Subtotal non-permanent personnel	105
Total	199

DISTRIBUTION OF THE UNIT'S PERMANENTS BY EMPLOYER: Non-tutorship employers are grouped under the heading 'others'.

Employer	EC	C	PAR
Université Côte d'Azur	45	-	8
CNRS	-	26	15
Total	45	26	23

UNIT BUDGET

Recurrent budget excluding wage bill allocated by parent institutions (total over 6 years)	4 244
Own resources obtained from regional calls for projects (total over 6 years of sums obtained from AAP IDEX, i-site, CPER, territorial authorities, etc.)	2 513
Own resources obtained from national calls for projects (total over 6 years of sums obtained on AAP ONR, PIA, ANR, FRM, INCa, etc.)	5 638
Own resources obtained from international call for projects (total over 6 years of sums obtained)	3 394
Own resources issued from the valorisation, transfer and industrial collaboration (total over 6 years of sums obtained through contracts, patents, service activities, services, etc.)	1 079
Total in euros (k €)	16 868

GLOBAL ASSESSMENT

Two major challenges during the last term have been 1) to reorganise the structure of the newly created INPHYNI into a single modern research unit, including the creation of the first two technological platforms and 2) to prepare the move of all teams, common services and platforms to the common workspace that has been under construction in the Plaine du Var. This challenge responds to the huge ambition of UCA and CNRS to create broad scientific excellence and research momentum in the Nice area, with an important role dedicated to INPHYNI. This has mobilised the entire staff of the unit and has put substantial pressure on the executive management. This tremendous task has largely been accomplished, but is not yet finished. The committee congratulates all members of INPHYNI for their precious efforts and for their active support, the management for its hard work to coordinate this difficult process, and the specially created technical committee for their precious follow-up of the construction work on the new building.

The technological platforms are now close to the operational. The unit is actively involved in the major new structures on the local and national levels, such as EUR, Doctoral School, CPER, Plan de Relance and PEPR. The committee would like to encourage the entire INPHYNI staff to support the last phase, to remain positive about what has already been accomplished, and to maintain its confidence in the future now that the final achievement is within reach. It is also important that the management keeps the entire staff well informed and involved, and that future decisions are taken in full transparency.

Despite this huge project, INPHYNI has managed to maintain an excellent scientific production, and succeeded in creating new emerging topics. Its connexion to the economic sector has been tremendously intensified in many forms (Cifre theses, labCom, start-up...). The shared technological platforms will play an important role in this ongoing process. The committee is concerned about how the unit will staff the many equipments that have been or that will be purchased. It is also important to anticipate as soon as possible the occurrence of the ZRR labelling (restricted research zone).

DETAILED EVALUATION OF THE UNIT

A – CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Former recommendations are shown in italic.

The evaluation in 2017 recommended to stimulate exchanges between theoreticians and experimentalists inside the newly created axes, and to merge different teams coming from the former ex-units. It encouraged INPHYNI to become one of the major actors of IDEX UCA JEDI. The committee advised INPHYNI to take full advantage of all new structures that have become available in the new landscape. It will be important to guarantee the presence of staff members of INPHYNI in the various decision-making bodies of University and IDEX UCA-JEDI, so to make INPHYNI the engine of physics in Nice. It will also be fundamental in this context that the supervisory authorities keep their promises and interact frequently with the DU.

The structure has evolved and the co-existence of 11 teams grouped in 3 axes involving fundamental, applied, theoretical and experimental activities is very satisfying. The five teams in the third axis may further evolve into three teams. The shared platforms play an important role in the coherence of the laboratory and in the ambition to make more connexions of INPHYNI to the economic sector. It is probably too early to identify a major role of INPHYNI in the IDEX landscape and the committee reiterates the recommendation given after the former assessment. Most actors (management and staff, authorities, this committee) agree that INPHYNI should become the cornerstone of physics in the Nice area and that INPHYNI is on the right track. INPHYNI staff is present in different bodies of IDEX and UCA.

The evaluation recommended increasing the participation in international conferences, to apply more for European calls, and to create more links to the (local) economic sector.

The self-assessment document in 2022 shows a huge international visibility, 10 projects are currently funded by the EC, among which two ERC grants. Many teams have commercial and industrial partners, 17 such collaborations are running, and one ANR LabCom and one start-up have been created. The further evolution of the technological platforms will boost this process.

Both former units have fairly similar operating methods which nevertheless differ in their budgetary policies. The management team of the new INPHYNI unit will have to work on standardising practices. It was also recommended creating an internal levy on contracts to make it possible to have internal calls with a clear scientific strategy.

A levy on external contracts (excepting the payroll) of 4% has been established, and 100 k€ has been redistributed each year through internal calls.

INPHYNI must continue to work on strengthening the links between training and research, the location of courses in physics on the same site as that which will host INΦNI, going in this direction. It would be interesting to increase training-research links with engineering schools in Nice and the region, by offering students internships in the laboratory, visits from research teams, etc. In a reciprocal way, the training could benefit from the international partnerships already existing at the level of research through the establishment of double degrees with European universities, or Erasmus Mundus Masters. This would increase the international visibility of the site and sustain the incoming and outgoing mobility of students and teachers. Increased links between INΦNI and all the training courses on the Nice site, including those in engineering, could open up new recruitment prospects at the doctoral level. It is also important to further increase the number of HDRs.

The new landscape in the Nice area provided by the arrival of the IDEX and the newly created EUR in 2020 is highly adapted to respond to these challenges and a huge opportunity for INPHYNI. However it is too early to see the long-term effects on the unit. Efforts are currently being undertaken to create attractive courses strongly connected to ongoing research, and INPHYNI must continue in this vein. 14 HDR defences have taken place (against 12 in the previous term), several candidates have been promoted to professor.

A scientific animation at the level of each of the three axes is an absolute condition so that their existence is not a simple display, but becomes a genuine structure for the new unit. This could lead, among other things, to a recomposition of the scope of certain teams, or even to groupings or re-compositions of teams. But this process will take time. It will also be necessary to set up scientific animation at the unit level, for example, by organising seminars and laboratories days.

Some effort has been made in this direction, and some former teams have merged. Nevertheless, the organisational structure in terms of 11 teams still prevails and the scientific council has been created comprising all group leaders. The committee reiterates the former recommendation to give more weight to the axes and to identify an animator to stimulate and develop the scientific activity within each axis.

Another structuring action could be the grouping of all ITAs into technical centres and services, like what was practised by the former INLN. The expected would be mutual compensation for the shortcomings of the former laboratories, greater cross-functionality of technical skills, the existence of a vector for exchange between teams, as well as better sharing of skills within the ITAs. The management must strongly involve all staff in the implementation of the fusion project, through regular meetings and working groups. The laboratory council will be one of the privileged bodies in this context. It will be essential to set up a building monitoring group which will be at work for the entire duration.

Two technological platforms (housing 5 sub platforms) and 4 common technical services now exist. Of course, the physical separation of the two sites complicates their tasks and a well-developed transverse action across the entire unit will have to wait until the move to La Plaine du Var. A special IT team has been created that follows and reports the events of the new building.

B – EVALUATION AREAS

EVALUATION AREA 1: PROFILE, RESOURCES AND ORGANISATION OF THE UNIT

Assessment on the unit's resources

The accounts of INPHYNI are entirely handled by CNRS (DDG: 'délégataire de gestion'). The recurrent financial support from CNRS and UCA amounts to 4.2 M€ (700 k€ on average per year, roughly equally divided between the 2 authorities) over the last 6 years. Almost 25% of this amount is spent on infrastructure, the majority on the purchase and maintenance of equipment. The unit has made a great effort to increase their external resources, and collected 1.5 M€ (which includes salaries for postdocs and PhD), equal to 20 k€ per year per permanent staff member by successfully applying to calls for tender by local IDEX (14% of all external support), by national ANR (40%) and by the European Union (28%), as well as 1 M€ from contracts with industry (6% of all external support). The budget is not equally distributed across the unit but a levy of 4% on overheads of external contracts (ANR + CE) guarantees that part of these external resources is distributed across the unit.

Assessment on the scientific objectives of the unit

The main challenge of INPHYNI has been and still is to proceed with the merge of the two former units with the second phase being the installation into one single building (which will be a second opportunity for internal organisation as well) and to become the cornerstone of physics in the Nice area. The first phase of creating one single unit with one single strategy out of two quite different research units has been successfully conducted. The presence of INPHYNI staff in all components of the scientific landscape (Idex, UCA) has started and should proceed.

Assessment on the functioning of the unit

The present internal structure with common services and major axes is well adapted to create one single unit despite the two sites. The management has made a real effort to complete this first phase. The scientific council works very well. Administrative requests by teams are executed by specially assigned members of the secretary desk.

1/ The unit has resources that are suited to its activity profile and research environment.

Strengths and possibilities linked to the context

With the new landscape, INPHYNI not only has the potential but even the obligation to become the cornerstone of physics in the Nice area. INPHYNI has a large number of topics – covering more than 10 sections of CoNRS, and strong links exist with other physics-related units in the Nice area.

The growing interface with the (local) economic sector is a great opportunity that the unit has started to explore successfully. With 45 faculty members from UCA and 26 CNRS researchers, 8 support staff from UCA and 15 from CNRS, it has clearly the full support from local and national authorities to provide them with the human resources they need.

The presence of many faculty members implies a dominating role in the teaching of physics. With the creation of the Academy of Complex Systems and the EUR SPECTRUM (that acts as the faculty of beta sciences), a tremendous opportunity exists to create training close to research, to foster interdisciplinarity, and to gain even more visibility and attractiveness for (external) students and visitors.

The unit seems to benefit from both a reasonably healthy age pyramid and a healthy recruitment at UCA and CNRS. The administration desk with seven permanent employees from CNRS and UCA (ratio 1/10 permanent scientists) is well suited to cope with daily matters of organisation.

Weaknesses and risks linked to the context

The site at INLN (and this seems to apply to the new building at Plaine du Var as well) is not close to the faculty of physics, which makes it (more) difficult to attract students.

Especially at UCA it is difficult to promote BIATSS and this sometimes leads to departures that weaken common services and platforms. This problem is difficult to solve (on a short term) with CDD, and it is also hard to get permanent staff. Two administrators left recently having experience in contracts management, and the number of active contracts has been rising significantly. The optical platforms are still spread across the Valrose campus.

2/ The unit has set itself scientific objectives, including the forward-looking aspect of its policy.

Strengths and possibilities linked to the context

During the past term, INPHYNI has been busy coping with the merge. The UCA and CNRS authorities agreed that this merge was necessary to anticipate the rapidly evolving scientific landscape.

The unit has all the assets to position itself in the IDEX landscape to make the most of this enormous opportunity.

Weaknesses and risks linked to the context

The written document contains no vision about how INPHYNI should exist in the near future inside the IDEX UCA-JEDI landscape, and in particular did not identify the necessary investment, the potential risks and the ultimate challenges (with a time line) that one may encounter to achieve this. These challenges are left to the new, still undefined, management team.

3/ The functioning of the unit complies with the regulations on human resources management, safety, the environment and the protection of scientific assets.

Strengths and possibilities linked to the context

Interviews with IT/BIATSS are conducted in principle with the person in charge of the service or team (some IT are assigned to teams, most of them to platforms and services).

The priorities for promotions are determined by the management team and no dysfunction (in terms of gender or team) has been identified.

The network service (3 IT CNRS) takes care of network security

Weaknesses and risks linked to the context

The present situation between two sites is not optimal to lower carbon footprint and is still a threat for the coherence of the unit as a whole.

Especially on the UCA side, the feedback of the rankings for promotions of technical and administrative staff are not transparent.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

The unit INPHYNI is attractive by the quality of its scientific output as well as by its considerable diversity in topics and methods. This attractiveness is boosted by a strong support on local and national levels and can be appreciated from the large number of visitors, PhD scholarships (no less than 56 PhD defences during the last term, almost 10 per year) and the shared specialised platforms. Attractiveness also benefits from new actions in quantum physics and technology as well as from interdisciplinary activities with biology, chemistry and engineering.

1/ The unit has an attractive scientific reputation and contributes to the construction of the European research area.

Strengths and possibilities linked to the context

The staff members have organised roughly 100 international events during the last term and delivered 750 contributed and invited talks at national and international events. A particular positive point is the organisation in Nice or Porquerolles of many, often recurrent, international events (Waves in Côte d'Azur, Complex Days, Fluids and Complexity, Photons and Atoms) that bring a lot of international attention to Nice.

The strong links of INPHYNI with the Scientific Institute in Cargèse as well as with the international unit Majulab in Singapore (where UCA and CNRS are also both founding authorities) contribute further to put the unit on the worldwide map.

Finally, INPHYNI is well integrated in many actions of national physical societies (SFP, SFO, ..).

Weaknesses and risks linked to the context

Several involvements in European networks exist, and two ERC have been obtained. Currently, only one network is active in Turbulence. Several topics at INPHYNI are highly eligible for these calls.

2/ The unit is attractive for the quality of its staff hosting policy.

Strengths and possibilities linked to the context

Scientific attractiveness is measured by the number of visitors, the number of PhDs that have joined the unit.

The number of PhD (snapshot DAE = 45) compared to 49 ETPR is large.

The ratio of habilitated to permanent researchers = 0.9 is also very large.

Weaknesses and risks linked to the context

Nothing to report.

3/ The unit is attractive because of the recognition gained through its success in competitive calls for projects.

Strengths and possibilities linked to the context

During the assessment term 2016-2021, 26 ANR contracts have been steered by INPHYNI members (PI), one ANR Labcom, two ERC were obtained as PI and a successful call in H2020. INPHYNI was partner in around 60 projects funded by JEDI-IDEX and 20 projects from both the region PACA and the CNRS.

It benefited from two PEPR programs as well as from CPER and the Plan de Relance.

Several teams have explicit funding from industrial contracts. It is worth emphasising that all teams are involved in projects funded locally (UCA IDEX-JEDI) or nationally (ANR).

Weaknesses and risks linked to the context

Only 5 teams among 11 are or have been involved in European networks (such as FP7, H2020).

4/ The unit is attractive for the quality of its major equipment and technological skills

Strengths and possibilities linked to the context

INPHYNI houses two major platforms, one on Optics & Photonics (support of 5 IT), and one on Soft Matter (support of 3 IT). They are both of high technological quality and used by several teams. The (sub) platform OPTIMAL benefited from substantial funding from CNRS and region PACA, the soft matter platform has recently been funded by CPER MICROMAG. They play a dominant (future) role in the interaction with economic partners.

Weaknesses and risks linked to the context

The platforms are still divided among two sites, and even across the Valrose campus. The move of INPHYNI to one unique building will be especially beneficial for the platforms.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

More than 600 publications in reviewed journals have appeared over 6 years that is roughly 2 per year per ETP Research. This is an excellent production. This scientific output has been published in leading journals in physics, engineering and related disciplines.

1/ The scientific production of the team meets quality criteria.

Strengths and possibilities linked to the context

The publications have appeared in internationally recognised peer-reviewed journals, by far most of them run by learned societies, and a significant part in so-called prestigious journals (Phys. Rev. Lett, journals of the Nature Publishing Group...).

Weaknesses and risks linked to the context

Nothing to report

2/ Scientific production is proportionate to the research potential of the unit and shared out between its personnel.

Strengths and possibilities linked to the context

The committee noted a relative homogeneity in the scientific production between the different teams. Of course, each faculty member generally has a significant teaching load, which was recognised by counting only 0.5 FTE. Teams 5 and 9 clearly produce more publications (per RPTT) because they have managed to recruit more PhD students.

Weaknesses and risks linked to the context

The production (normalised to ETPR) seems to vary by a factor of almost three among the teams. This is just an observation, not really a problem, given the variability that depends on the subfield, scientific methods and quality.

A few individual staff members were identified as being significantly less active than average but, relative to the total number of active permanent staff, this is no more significant than at the national level (a few percent at most).

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science.

Strengths and possibilities linked to the context

All accepted manuscripts have been deposited in Archives such as ArXiv and HAL, complying with national policy.

Weaknesses and risks linked to the context

Unfortunately, the website was not finished during the assessment and the link to HAL was not very visible (<https://inphyni.univ-cotedazur.fr/diffusion-scientifique/publications-scientifiques>)

Several teams produce large data files, and the strategy if and when to protect data or to put them openly accessible is not specified. **Future ZRR policy will undoubtedly impose rules and constraints.**

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

Assessment on the inclusion of the unit's research in society

Many constructive and punctual interactions with the local economic sector exist, and more will exist in the future. Members of INPHYNI are very active in the interaction with (local) broad audience. It may be necessary to identify some 'grand' challenges in society where the unit can contribute in the future, supported by industrial and social partners. Clear opportunities that INPHYNI can seize are carbon footprint & climate, quantum technology, and energy saving.

1/ The unit stands out by the quality of its non-academic interactions.

Strengths and possibilities linked to the context

During the last term, INPHYNI has increased the number of interactions with industry. This link has been strengthened by proactive IDEX policy and the national 'Plan de Relance' launched in 2021.

A few patents have been obtained (Team 3 and 6) and one 'SATT projet de prématuration' on an optical fiber dosimetry has been granted to team 4.

Team 2 has contacts with the start-up Greenerwave created at the Institut Langevin in Paris on applications of chaotic reverberation of microwaves. The local quantum cryptography network set up by Team 5 with the company Orange is exemplary. In team 6, the Labcom SOFLITE has been created with the ultrafast optics company FASTLITE located in Antibes. Teams 6 and 7 have a partnership with the start-up Klearia concerning microfluidics & pollution measurements. Team 8 has contacts with Airbus and benefited from postdoc funding from the Ariane Group. Team 9 is very well funded by a number of industrial contracts with Veolia-Valsud and Axlepios Biomedical, CNES and others. Team 10 has obtained a PhD scholarship from the company K-epsilon on swimming locomotion.

Weaknesses and risks linked to the context

The interactions with commercial companies are sometimes 'punctually beneficial' and it may be necessary to define a global policy of the unit – supported by an officer in or outside INPHYNI to coordinate and foster these interactions professionally in the future.

The increasing involvements of commercial partners (around the technological platforms) may jeopardise the challenges of open science, and the future ZRR definition (Zone à Régime Restrictif) will impose all kinds of restrictions (access of visitors, open data, ...) that the unit should anticipate.

It is not always clear if a real objective (of unit or unit members) exists to progress in terms of TRL degree at the long-term. Several projects bring in convenient external funding but show no real intention to go beyond the 'premature' status.

2/ The unit develops products for the socio-economic world.

Strengths and possibilities linked to the context

See above

Weaknesses and risks linked to the context

See above

3/ The unit shares its knowledge with the general public and takes part in debates in society.

Strengths and possibilities linked to the context

All teams contribute to the very popular annual science festival in Mouans Sartoux, and to the unique annual Nice Nobel Prize days organised by UCA.

Team 10 organises exhibitions in the 'Maison de l'Intelligence Artificielle'.

Weaknesses and risks linked to the context

The staff members at INPHYNI have teaching skills, to various degrees, and should therefore take part in large societal debates such as quantum technology, energy saving, climate and artificial intelligence. A latent awareness of such issues is indeed widespread at INPHYNI and should motivate this societal involvement.

C - RECOMMENDATIONS TO THE UNIT

Recommendations regarding the Evaluation Area 1: Profile, Resources and Organisation of the Unit

It is important that the unit finalises its internal organisation and formulates a political and scientific strategy to define INPHYNI on the IDEX landscape to (continue to) benefit as much as possible from this huge opportunity.

It is recommended, once moved to the new premises, to assign a more significant role to the three axes, for instance by identifying in each axis a person in charge of organising seminars weekly, updating a webpage of the axis and communicating requests to the unit management. This will stimulate the communication between the teams within the axes and even between the different axes.

It is important to have a long-term perspective on the sustainable technical support of ITA/BIATSS that runs the platforms, and to anticipate the vital and often time-consuming training of new recruitments. It may be necessary to explore the possibility that different EUR and different CNRS Institutes (such as INSIS) become (more) involved in the recruitment of technical support. It is important that all INPHYNI teams have priority access to all platforms.

It is crucial to initiate as soon as possible a collective dialogue about the future management of the unit (who and how) and to formulate a collective project that can be proposed to the authorities UCA and CNRS. This project should look into the future and should not rely too much on the past. If this happens after the move, time will be very short.

In view of the considerable distance (55 min for Valrose faculty by public transportation, for Polytech Sophia even more) between the new premises and the university teaching facilities, it is necessary for faculty members to have a pied-à-terre close to their teaching locations.

Recommendations regarding the Evaluation Area 2: Attractiveness

It is recommended to continue to foster the interactions between the teams and to optimise the internal coherence of the unit.

The large and increasing attractiveness of the platforms may be highlighted locally and nationally to attract technical support to INPHYNI. They may also be useful to organise training at Master level, to attract potential PhD students. It is recommended to assign new technical recruitment to the platforms as much as possible and not to the teams.

INPHYNI has benefited from a large number of visitors and it is important to anticipate the ZRR label as early as possible.

In view of the many foreign PhD students, it is recommended to write the main management emails to the entire staff both in French and English versions (automatic translators exist).

Recommendations regarding Evaluation Area 3: Scientific Production

It is recommended to maintain the quality, quantity, originality and emergence of novel topics. INPHYNI has to seize the opportunity to convert multidisciplinary into interdisciplinarity, and make sure to preserve the precious but fragile interfaces with chemistry and biology.

It may be necessary to establish a formal and transparent policy about the co-authorship of technical support on scientific publications. Technical staff should be informed when they are officially part of the grant proposals. To date, this is not always the case.

Recommendations regarding Evaluation Area 4: Contribution of Research Activities to Society

The link to and support from the economic sector have been firmly established. This process should, of course, be continued.

The imminent ZRR label will affect the relation and INPHYNI has to make sure to turn this process into its advantage.

It would be useful to create a communication desk that maintains the website of INPHYNI (currently not in perfect shape), that tweets scientific highlights and events on behalf of the whole unit, and that advertises events and equipment available in the unit.

RESPONSES TO SUPERVISING BODIES CONCERNS

TEAM-BY-TEAM ASSESSMENT

Team 1: Physique théorique/Theoretical physics

Name of the supervisor: M. Frédéric HEBERT

THEMES OF THE TEAM

This team has a variety of numerical and analytical activities mainly on topics related to quantum physics: non-linear quantum fluids, correlated quantum materials, quantum neural networks, quantum field theory and QCD, universality of few-body ground states, quantum transport in low dimensions, and bosons/fermions in one dimension. A small activity on classical physics exists on extended general relativity.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The recruitment of a new researcher in the field of few-body physics, as required by the laboratory, is recommended to further improve the visibility of the group. It will be necessary to work on the integration of the theoretical physics team in the new unit, in particular by encouraging interactions between the field of few-body physics and the research of team 3 (Correlated quantum systems). There are no publications on general relativity... There is a relatively low participation in international conferences. In spite of the interest aroused by the work, the group did not succeed in recruiting permanent young researchers. The number of PhD students during the contract is very low.

The new team 1 is the result of a well-succeeded fusion of the former two teams 3 and 4 at INLN as was recommended. The physics of few bodies is still present with several good publications but is no longer a core activity. Similarly, during the last term, only two publications appeared on projected general relativity (reducing it to a sub activity).

A new and modern activity on quantum networks has emerged, the one on cold atom physics has been growing a lot, and a strong activity on correlated physics has been brought in by former team 4.

Two PhD students have graduated and three are running; One associated researcher was recruited in 2020 reinforcing the excellent activity on quantum liquids.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	2
Lecturer and associate lecturer	6
Senior scientist (Directeur de recherche, DR) and associate	2
Scientist (Chargé de recherche, CR) and associate	1
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	11
Non-permanent teacher-researchers, researchers and associates	3
Non-permanent research supporting personnel (PAR)	-
Post-docs	-
PhD Students	3
Subtotal non-permanent personnel	6

	Total	17
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EVALUATION

Overall assessment of the team

This team has a very good activity on different items in especially quantum physics, with a good international visibility. They have close connexions with Majulab (a joint international unit of CNRS/UCA with 2 Singapore universities) as well in Argentina via a LIA, and ongoing collaborations with Italy and Japan. The fusion has been a very good step to acquire a critical mass. Two major players retired. Two PhDs have defended their theses and the team published 70 articles (i.e. 2.1 per year per ETPR) in peer-reviewed journals.

Strengths and possibilities linked to the context

The team has an excellent scientific production with great visibility and many collaborations on the national and international level.

They have many fruitful projects going on with team 2 on Waves in Complex Media.

The team members have organised many scientific events and many PIs in this team have (had) heavy administrative duties (director of the unit, director of the physics department, member of CNU, CoNRS).

A probability exists to welcome one or two members of Majulab that may return to France.

Weaknesses and risks linked to the context

The scientific production is dominated by faculty staff members, two of which fortunately benefit (ted) from an IUF support.

Among the different activities we have core activities, such as correlated systems and cold atoms, and side activities (GR, few bodies) that are likely to disappear soon, but that have all been put on the same footing.

RECOMMENDATIONS TO THE TEAM

The team title 'theoretical physics' is a clear compromise to justify a wide spectrum of themes but is not very attractive, also knowing that significant theoretical activity takes place in other teams.

It could be promoted to a more attractive and specific title of the kind 'Quantum Physics of Waves and Matter' which would cover much better the (core) activity of the group inside the first axis.

The team could put more emphasis on emerging and core activities without giving upside activities.

Team 2: Ondes en milieux complexes/Waves in complex systems

Name of the supervisor: M. Fabrice MORTESSAGNE

THEMES OF THE TEAM

The team is active in several areas concerning the interaction of electromagnetic fields and matter. The research is largely experimental and concerns both the microwave domain and the infrared/optical domain. Notable activities include topological effects in artificial photonic structures, non-linear effects in resonators and photo-refractive materials and the manipulation of fields in complex, disordered media. The team also uses a direct laser writing technique to create three-dimensional waveguides in a transparent bulk material. Applications include antenna characterisation, microwave limiting and uniformisation of pump intensity in fibers.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The INPHYNI lab in general was encouraged to recruit new members, and the Waves in complex media group has indeed recently recruited a new CR, a former postdoc in the group).

The group has established a collaboration with another recent arrival in the theoretical physics group.

Another general recommendation for the team was to increase its 'local visibility'.

This is being done through their participation in the 'Nice Physics Camp' which is directed by undergraduate students.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	3
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	-
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	7
Non-permanent teacher-researchers, researchers and associates	4
Non-permanent research supporting personnel (PAR)	-
Post-docs	-
PhD Students	4
Subtotal non-permanent personnel	8
Total	15

EVALUATION

Overall assessment of the team

All the team members are active, productive researchers. They have attracted several PhD students, postdocs and international visitors, all or most of whom appear to be strongly contributing to the research. The team members have also been very active in the organisation of conferences and workshops, 11 during the evaluation period.

Strengths and possibilities linked to the context

The various activities of the group are well integrated.

The group profits from many collaborations: There is extensive collaboration between the different group members on a variety of topics. The group collaborates with other members of the laboratory, notably the theory group. Thus, one can say that the group is well integrated in the rest of the INPHYNI unit.

A collaboration has been initiated with a start-up (Greenerwave) to investigate chaotic reverberation chambers and perform antenna characterisation. Finally, the group clearly has significant international collaborations (Vienna, Leicester...) which have led to high-profile publications.

The scientific productivity is excellent with 49 publications over 6 years (2.3 per year per ETPR); Seventeen of these publications included PhD students, and nine of them were done in collaboration with other groups at the unit, mostly the theory group.

There have been seven PhD thesis defences during the evaluation period.

Weaknesses and risks linked to the context

While the team as a whole is publishing quite actively, the individual publication rates vary significantly between the different members.

RECOMMENDATIONS TO THE TEAM

The team has been very productive. Their many collaborative projects are especially to be encouraged.

Team 3 : Atomes froids/Cold atoms

Name of the supervisor: M. Robin KAISER

THEMES OF THE TEAM

The cold atoms team studies the atom-light interaction with different experimental platforms (mainly four cold atoms experiments). They use noise spectroscopy and noise correlation measurements to infer information about the atom-light interaction. Light scattering in cold, dense clouds allows them to tackle cooperative effects in the interaction of atomic light (sub-radiance and super-radiance). The self-organisation of atoms in the presence of light is also a subject much studied by the team. For some years, the team has also been involved in a collaboration with astrophysics, using measurements of intensity correlations.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Strategies to attract postdoctoral researchers and thesis students from abroad should be worked on. The funding of the group could be a concern in the future, as it is mainly based on ANR sources. Care should be taken to diversify the funding sources. Applying for European funding sources is also highly recommended in order to maintain the research objectives on medium-term time scales.

The total number of people in the team has almost been doubled since the previous committee, which shows that the team is even more attractive and dynamic. The large number of doctoral and post-doctoral students from France and abroad shows that the team is attractive and has a good international visibility. A collaboration has been initiated with a Brazilian researcher who regularly comes to work with the team for long sabbatical periods.

During the evaluation period, the team has been very successful in obtaining funds from various sources. A new experiment with cold Ytterbium atoms was launched thanks to an ERC H2020 on the Anderson localisation of light by cold atoms. The group has also been successful in different projects funded by the ANR and the region and most of the members are PI of one of these projects.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	-
Senior scientist (Directeur de recherche, DR) and associate	2
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	5
Non-permanent teacher-researchers, researchers and associates	6
Non-permanent research supporting personnel (PAR)	-
Post-docs	3
PhD Students	6
Subtotal non-permanent personnel	15
Total	20

EVALUATION

Overall assessment of the team

The team has a very good activity. Its size has greatly increased since the last assessment. Collaborations are active and fruitful, locally, nationally and internationally. Since 2016, the cold atoms group has produced remarkable research work. The publication rate is very good (2 per year per ETPR). In 2019 an ERC project was obtained by the group leader and strengthens the position of the team at the international level. The objective, Anderson Localization of Light is very challenging and illustrates the strong ambitions of this team.

Strengths and possibilities linked to the context

Since 2016, the cold atoms group has produced remarkable research work.

The team has been recognised thanks to remarkable results on the cooperative effects of light interacting with samples of dense cold atoms (coherent back scattering and laser without cavities). During the evaluation period, the team has obtained two major new results on the sub-radiance and super-radiance.

The publication rate is very good (publication rate of two per year per ETPR) for an experimental activity involving complex experiments that take significant time to mount and run.

Since 2022 all permanent members of the team are habilitated and since the last evaluation, seven PhD theses have been defended.

The strategy of the group which consists of using traditional experimental platforms to trap and cool cold atoms (No BEC or Fermi Seas, no lattices) is very successful. Each member is in charge of an independent structure, which allows him to acquire his independence and to develop his personal activity and his creativity. At the same time, numerous results are shared by the various members in publications, testifying to a good team spirit. It is striking that this strategy, combining very solid theoretical studies with experiments, allows the team to harvest interesting and creative physics.

International collaborations are fruitful: on the Rb1 experiment, a collaboration with a Brazilian researcher gives very good results on noise correlation measurements. Many studies have also been obtained regularly on the self-organisation of atoms.

During this period, the team was also very creative, launching two new lines of research:

With its know-how on intensity correlation measurements, the team launched a remarkable project with astrophysicists using a telescope on the Calern observatory (I2C project). This project is a good example of a real interdisciplinary collaboration, at the local level on Université Côte d'Azur, and involving all members of the team.

A new cold atom platform with the very ambitious goal of observing the Anderson localisation of light on cold atom has been developed since 2019. The team will hire an assistant professor in September 2023 on this project. This will strengthen the research power of the group.

Weaknesses and risks linked to the context

The team has four cold atom experiments running. Moving them to the new building presents a high risk of disrupting or even resetting this activity and group dynamics. In particular, the Yb project aims to achieve a very competitive goal, the move must be well prepared and will take time.

Most of the activity on contract leverage is centred on one person. An effort has to be taken to spread this competence and responsibility among the team members. The CNRS members of the team have almost all reached a senior position at the CNRS (3 DR, one CR with HDR), which facilitates such responsibilities. Although encouraged, administrative responsibilities could also significantly slow down scientific production.

With the development of the new Yb platform and the strong involvement of the team in a collaborative project in astrophysics, a risk of dispersion exists.

On some of the Rb experiments (Rb1 and Rb3), future experimental developments are not presented. The pool of ideas will dry up if new experimental developments are not planned. The future objectives and research products on these two platforms are not very clearly announced.

RECOMMENDATIONS TO THE TEAM

The cold atoms group produces a very good research with a high variety of results. It must just continue like this.

Team 4 : Fibres optiques et applications/ Fiber optics and applications

Name of the supervisor: M. Bernard DUSSARDIER

THEMES OF THE TEAM

The team designs and manufactures preforms and optical fibers by inserting specific dopants or nanoparticles. They optimise them for sensing applications (for harsh environments – radiative – and food processing) or the development of advanced light sources.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team has almost entirely followed the recommendations of the previous review:

Reinforce scientific productivity.

The publication rate has indeed been reinforced (from 35 to 55 RICL at constant manpower) and its quality maintained at a very good level.

Increase local and national networking.

The team has followed the advice of the previous evaluation committee by continuing to develop local collaborations with companies (IXBLUE) or academic ones with several partners.

Develop Patenting and promotion of results.

There are no patents mentioned in the report. However, one pre-maturation project is underway (DROID) which could lead to a patent. On the other hand, the number and quality of publications and communications are quite good, which reveals a meaningful improvement of the valorisation of the results in a broad sense, as was recommended.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	2
Lecturer and associate lecturer	-
Senior scientist (Directeur de recherche, DR) and associate	2
Scientist (Chargé de recherche, CR) and associate	-
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	4
Non-permanent teacher-researchers, researchers and associates	2
Non-permanent research supporting personnel (PAR)	-
Post-docs	-
PhD Students	2
Subtotal non-permanent personnel	4
Total	8

EVALUATION

Overall assessment of the team

The team has developed very specific competences in the inclusion of nanoparticles and dopants in silica-based preforms and fibers, which are recognised at the national level through their participation in several national projects and networks. The international visibility is less developed but exists. The scientific production is of good quality in specialised journals of the field (Scientific Reports, Opt. Mat. Express) and of very good quantity with more than three RICL per ETPR. The attractiveness for students is very good because five theses have been defended and three are ongoing. They have developed a strong collaboration with companies specialised in fibre optics (IXblue) through joint research projects. The move to the new building is a great opportunity to upgrade their equipment (funded by the Equipex) and to start new research activities thanks to the state of the art of these new facilities. The manpower ((3 ETPR C/EC + 1 BIATSS) seems to be too limited to operate these complex fiberising systems.

Strengths and possibilities linked to the context

A solid know-how on the inclusion of nanoparticles and dopants in silica-based preforms and fibres, highlighted by the participation in several projects (see below) and a very good scientific productivity (55 papers: 3 per year per ETPR).

Co-design: from the fabrication of special optical preforms and fibers to their functionalization for detection or laser applications.

Good attractiveness of PhD students (8)

Participation in several national grants (ANR, ANDRA, EquipEx) and national networks (GIS verre and Griffon).

Strong involvement in the diffusion of scientific culture (15 conferences for the general public, 6 Nobel Prize days, 2 press articles...).

The new building is a great opportunity to renew, modernise or reorganise the fibre facility in order to improve its performance.

The perspectives for the coming years are clear and seem very promising.

The creation of an open fibre platform is being considered.

Weaknesses and risks linked to the context

The human resources (3 ETPR) are too weak to support a sufficiently broad scientific policy around a theme. If no recruitment is made, the number of projects or the utilisation rate of the fibre manufacturing plant will have to be revised downwards.

International visibility is moderate. There is a modest participation in European projects or networks.

The creation of a fibre platform could lead to problems of intellectual property or security issues with companies, with possible conflicts with the imminent ZRR label.

RECOMMENDATIONS TO THE TEAM

To continue to reinforce and develop the historical competences of the team and to explore new ways of manufacturing preforms/fibres by 3D printing, for example.

To maintain this very good scientific production in terms of quantity but also quality.

To develop the participation in European projects/networks.

To reinforce the collaboration with the other teams of the laboratory or build a broader team by reorganising the teams in the lab.

To recruit a new collaborator to face future ambitious projects.

Team 5 : Photonique et information quantique/ Quantum photonics and information

Name of the supervisor: M. Sébastien TANZILI

THEMES OF THE TEAM

The research activities of Team 5 (Quantum Photonics and Information) are oriented towards quantum optical technologies and applications (cryptography, telecommunications, sensing), from both applied and fundamental points of view, with the final purpose of microchip integration. For example, they develop on-chip manipulation of quantum states with various coding schemes, long-range quantum communications with fibre-optic links, optical interferometry with quantum-enhanced accuracy. Various technological platforms are used: lithium niobate, silicon, silicon nitride, and glasses. A new axis on quantum memories based on rare-earth doped crystals is emerging.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

All recommendations have been taken into account and are globally fulfilled.

Maintain a positioning ranging from fundamental physics to applications with an important technological component.

Theoretical work has led to the concept of morphing super-modes, emerging from the dynamics of multimode systems while applications are addressed in different systems: generation of Fock states on a chip, chip-based squeezing at a telecom wavelength, entanglement distribution over 150 km in WDM, for example.

It is desirable that some of the other members put themselves forward, which will benefit the whole team. This would give an even greater visibility and influence.

Young researchers have joined the team and started contract-supported research as PIs. One team member has obtained an IUF discharge.

Efforts to create links with industry should continue.

The team has contracts with Thales and Accenture. The synchronisation scheme for quantum networks is being patented.

Some members of the team could take more responsibilities, for the benefit of the whole team. It would be desirable that some of them pass their HDR.

Two researchers have obtained their HDR during the assessment period, and two others are preparing.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	-
Lecturer and associate lecturer	5
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	9
Non-permanent teacher-researchers, researchers and associates	9
Non-permanent research supporting personnel (PAR)	-
Post-docs	1
PhD Students	10
Subtotal non-permanent personnel	20
Total	29

EVALUATION

Overall assessment of the team

This team is leading on the subject of quantum photonics at the international level. Over the last six years, they have proposed and realised many new functions on integrated devices, widening the route to the practical implementation and the use of quantum resources. Their results are published in high quality journals. The team fosters many national and international collaborations, work with companies (notably Orange for the quantum network), and shows to be successful in collecting contracts at the national and European level.

Strengths and possibilities linked to the context

The scientific production is of high quality, as attested by the 40 papers (1.3/year/ETPR) in international peer-reviewed journals, all in high-ranking journals. This active research is fuelled by a high level of funding through many different contracts: ANR (7), ANR-Astrid (3), AID (1 PhD), EU contracts (FP7, H2020).

Scientific outreach of the team is evidenced by dozens of invited talks given by the team members. Highlights of the team are well recognised outside the laboratory (in CNRS INP News, in Nature Photonics, in Optica's OPN). The team's head has been appointed scientific deputy-director of the CNRS/INP, one team member was appointed IUF junior member. Engagement in the Big Bell test proved the ability of the team to stand at the forefront of international effort on quantum technologies. The attractiveness of the team is obvious, with a new MCF position in 2019 and a CR CNRS in 2020, an invited professor. The team is young.

Interaction with the economical world is also vivid, with three contracts (Thales Alenia Space, Accenture) and one CIFRE (ST microelectronics), in addition to the quantum@UCA project using Orange resources. It shows the strong team's interest in transforming fundamental ideas into real-world applications.

The team is fully engaged in training through research. Two members of the team have obtained their HDR. Seven theses have been defended, and 11 are still present, with many different funding sources. The perspectives of PhD students to find jobs in the industry are excellent.

The strategy is ambitious. It includes hybridisation of quantum function (cf. quantum@UCA project), investigating the multimode approach to quantum information, all this with the constant concern on integration at the smallest level. Quantum sensing and metrology, quantum memories using integrated rare-earth doped crystals, are also promising new lines of research.

Weaknesses and risks linked to the context

The team's activity seems to be strongly dependent on the team leader, who holds many responsibilities – PI of many contracts, national instances.

The spreadsheet file of INPHYNI does not reveal the patents of this team, while collaboration with industry has taken a large place in the team's activity. The universal synchronisation scheme for quantum networks is being patented. In the competitive, burgeoning field of quantum technologies, the team should beware of protecting their own ideas and technological solutions.

There are some strong disparities in the publication level of the different team members, a fact partly hidden by the overall, very good production. All team members should be encouraged to lead projects.

The team can benefit from the current trend on quantum technologies, but initiating too many different projects could be risky without long-term engagements supported by tenured staff.

RECOMMENDATIONS TO THE TEAM

Thanks to its significant level of scientific quality and production, and its large recognition and attractiveness, the team members should apply for ERC grants (they undoubtedly already did that move is encouraged).

The responsibilities in the team should hopefully be leveraged in the next years by the young collaborators, those having passed their HDR

As a strong opportunity, the so-called second quantum revolution already fuelled by the 'Plan Quantique' at national and European level, will certainly keep on growing. The team is in an ideal position to become a longstanding leader at the international level in the field.

We encourage young people to think about transferring new ideas and protocols from the laboratory towards industrial activities.

Team 6 : Matériaux et systèmes photoniques complexes/ Complex photonic systems & materials

Name of the supervisor: Mme Aurélie JULLIEN

THEMES OF THE TEAM

The team develops topics in the field of photonics. The first objective is to propose new optical sources by integrating passive or active materials in complex architectures. The second objective is to manipulate and modulate fundamental properties of light such as frequency, coherence, space-time dynamics and transport in complex optical networks. For these purposes, different experimental platforms are used such as liquid crystal devices for the manipulation of ultrashort laser pulses, non-linear optics integrated on lithium niobate, and semiconductor materials and lasers emitting in the visible and near infrared.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The team was created in 2020 from 3 previous groups: 'Dynamique et complexité photonique', «Optique des cristaux liquides» and «Photonique». For this reason, it is difficult to report all the recommendations of the previous committee. Nevertheless, the common recommendations were

Recruitment and integration of new researchers and attracting high-level students and postdocs. These recommendations have been globally followed. Two members have been recruited and the recent recruitment of a 'directeur de recherche' and the arrival of another researcher will compensate for the three departures. The attractiveness of the team has increased as shown by the numerous PhDs and postdoctoral students.

Promote or pursue collaborations, especially at the international level, to increase the visibility of the team. This recommendation has been fully followed as shown by the numerous national and international collaborations.

Promote or pursue collaborations with industrialists. These recommendations were perfectly followed with the numerous collaborations established with industrialists (Labcom with Softlite, Kleria, Oberon Sciences, BBright).

Maintain or establish collaborations within the axis or with the other axes of the unit and mutualise the tools through the platforms. The aspects concerning the interactions with the different axes of the unit as well as the interactions within the team and the mutualisation of tools at the level of the platforms have been strongly developed.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	4
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	4
Scientist (Chargé de recherche, CR) and associate	-
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	10
Non-permanent teacher-researchers, researchers and associates	8
Non-permanent research supporting personnel (PAR)	-
Post-docs	1
PhD Students	7
Subtotal non-permanent personnel	16
Total	26

EVALUATION

Overall assessment of the team

The team develops a wide range of activities in the field of photonics. The team was formed in 2020 with people from 3 different teams. The research topics developed are therefore very diverse and each person has been able to bring his own expertise. The results obtained during the period are of a very high quality as shown by the large number of publications, many of them in excellent journals. The team has also established fruitful collaborations in France, in Europe and in the world. Numerous contracts have been obtained, notably from the ANR. The creation of this team is a real success.

Strengths and possibilities linked to the context

The team 'Matériaux et systèmes photoniques complexes' has a good publication rate since 88 articles have been published with an average of 8 active permanent researchers during the period. The production rate of the group is 14 publications per year. In average, this represents two or three papers published per researcher per year (2.7/year/ETPR).

The members of the team have participated actively in the organisation of numerous conferences.

The number of collaborations in France, in Europe and in the world is large showing the large international reputation of the team.

Concerning financial support, the team has obtained a large number of grants over the period, notably with the ANR.

The attractiveness of the team is very good as shown by the number of PhD students (8 defences over the period, seven theses in progress) and postdocs (6 postdocs over the period).

The team has developed interactions with industry through various partnerships. The Labcom SOFTLITE (in collaboration with the company FASTLITE) is a real success especially for the financing and the co-supervision of PhD theses. The partnerships with KLERIA, Oberon Sciences and BBright are also very interesting. The two patents filed during the period are also very positive.

Weaknesses and risks linked to the context

The team was created in 2020 with people from three different teams and each person was able to bring in its own expertise. Thus, the diversity of topics is important and the research activities are developed inside five subgroups. Few joint publications exist among subgroups showing for the moment a weak interaction between these different topics. There are also few publications obtained in collaboration with other teams of the unit. However, these observations must be qualified in view of the recent creation of the team.

Moreover, despite the good international visibility of the team, there is no project funded by Europe during the period.

During the period 2016-2021, three members have left the team and one member will retire during the next period. In addition, the age pyramid is clearly inverted.

The permanent members of the team are mainly rang A members (professor or research director): out of the eight current permanent members, there is only one assistant professor.

RECOMMENDATIONS TO THE TEAM

Continue what has been initiated because it is globally very good. The installation of the photonics platform in the new building is a real opportunity to develop interactions and new research topics. Three points exist that could be improved:

Strengthen the interactions between the different team members and take advantage of the expertise of other teams (e.g. by the sharing of experimental tools, projects...).

Strengthen the international collaborations, especially in Europe, to develop networks (European projects).

Recruit a young researcher or a young assistant professor to invert the age pyramid.

Team 7 : Microfluidique, physico-chimie et biologie aux interfaces/ Microfluidics, physical-chemistry and biology at interfaces

Name of the supervisor: M. Xavier NOBLIN

THEMES OF THE TEAM

The MIMIC team investigates a broad range of projects on soft matter physics, small-scale hydrodynamics and biophysics. The projects include wetting of Superhydrophobic surfaces, droplet dynamics, cavitation, the growth and pattern formation in bacterial and fungal biofilms and micro-swimming of plant pathogens. An important part concerns experiments, completed by numerical simulations and modelling in a complementary and fruitful way. Its trademark is to address a subject from its fundamental mechanisms to applications, such as breath figures (from a doublet to an ensemble of droplets, applied to the collection of dew) and cavitation (from hydrogels to xylem in trees, with applications in damages on trees due to drought).

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The balance of published papers is now more homogeneous between the different team members.

Regarding the increase of the staff having HDR, there is still only one member having it (a former team member passed it, but left the team in 2017). For a good balance in the supervision of PhD students, this is crucial that other members of the team get HDR.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	-
Lecturer and associate lecturer	2
Senior scientist (Directeur de recherche, DR) and associate	-
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	4
Non-permanent teacher-researchers, researchers and associates	2
Non-permanent research supporting personnel (PAR)	-
Post-docs	1
PhD Students	1
Subtotal non-permanent personnel	4
Total	8

EVALUATION

Overall assessment of the team

MIMIC is a very active team, with original research themes going from soft matter to biophysics. The team has had four PhD students and four postdocs, has active collaborations with prestigious foreign groups. The research is funded by many contracts. The topics are original and appealing, and prone to popularisation, which is an important part of the team activity. The team has published 20 articles in international journals, 5/ETPR or less than 1/ETPR/year. Besides the quantitative aspect, many of these articles are published in highly selective and high impact journals.

Strengths and possibilities linked to the context

The team has high publications records (1.3 articles/ETP/year) generally in highly selective journals.

The team has recruited a CNRS researcher, starting a new activity in turbulence.

The research topics are very original and cover a broad range of subjects in soft-matter, hydrodynamics and biophysics.

Some of the topics and associated results have obvious applied prospective, especially in environment and smart engineering.

The team attracts many talented PhDs and postdocs.

The team has obtained many contracts to fund salaries and equipment (in particular 4 ANRs).

The team participates in various research networks (GDR).

Several members are involved in teaching in Master degrees.

The team regularly participates in events of science popularisation and dissemination to the public.

The proposed project is both realistic (in line with previous research) and ambitious.

Weaknesses and risks linked to the context

Despite a very proficient research, the number of permanent staff is rather small for a single team, which could induce a risk of too large dispersion, given the large number of active subjects. In addition, two assistant professors have full teaching charges.

Only one team member has HDR.

Only two PhD defences have taken place over the period. The team could try to increase this number.

RECOMMENDATIONS TO THE TEAM

Strengthen collaborations with other teams of INPHYNI, especially Team 10.

Use the frame of the CPER Micromag for that.

Draw collaborations with experts in (1) mechanics of wood, (2) plants pathogens.

Seek for partners in industries for a few topics (swimmers, dew condensers, ...) already started with partnership with Klearia

Team 8 : Rhéologie des suspensions concentrées /Concentrated suspensions rheology

Name of the supervisor: Mme Elisabeth LEMAIRE

THEMES OF THE TEAM

The team activity is focused on the rheological and hydrodynamic study of concentrated suspensions. In particular, it aims to understand and quantify the importance of hydrodynamic and solid contact interactions between particles. Both effects can be discriminated by the reverse shear flow technique. Experiments and numerical modelling are coupled. The projects are funded by both academic (ANR) and industrial (Ariane) contracts.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

While, it was recommended in the previous evaluation, the team has not developed more collaboration with other teams in INPHYNI. Nevertheless, there is an interesting opportunity for fruitful collaborations with complementary knowledge. While it is understood that such collaborations take time to install, the committee reiterates here this advice especially with the teams in soft matter and biophysics.

Following the recommendations of the previous committee, the team has strengthened its collaborations with the industrial world. Also, the team has attracted more PhDs than in the previous evaluation.

Except her leader (who is released from the presidency of CoNRS Section 5), the team remains composed mostly of university staff. Unless it was not mentioned explicitly in the report, there is no sign of CRCT or equivalent measure (IUF) obtained by team members who could have allowed more time for research activities.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	-
Lecturer and associate lecturer	3
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	-
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	4
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	-
Post-docs	-
PhD Students	1
Subtotal non-permanent personnel	2
Total	6

EVALUATION

Overall assessment of the team

The research topics are unique in France. The approach is at the crossroad between soft matter, rheology and hydrodynamics, combining experiments and numerical modelling. The results are far-reaching and with large peer recognition. With 17 articles for 2.5 ETP (1.13/ETPR/year), generally in journals of high impact, the team has a good rate of publications. The team is regularly funded by academic and industrial contracts, which has enabled the hiring of four PhDs (3 PhD defences during the last term) and one postdoc. Finally, the team participates in various GDRs and is regularly awarded by different distinctions.

Strengths and possibilities linked to the context

The team conducts very unique and original research in a rather so far under-investigated topics (dense non-Brownian suspensions).

The team obtained key results for the understanding of the rheological behaviour of dense suspensions, allowing to discriminate the particle contact and hydrodynamics effects.

The team publishes its results in very good journals.

The team is rather attractive for talented PhD students and postdocs.

The team seems strongly built around its leader, with good homogeneity in the publication of all members

The team has regular industrial contracts and mention another future one with applications in mixing in dense suspensions

The proposed project is really sound, ambitious and realistic. The addressed questions are deep and promising.

Weaknesses and risks linked to the context

Despite a very proficient research, the number of permanent staff is rather small for a single team.

RECOMMENDATIONS TO THE TEAM

The team could be more open to international collaborations.

The research activities are quite compatible with many applications like the dynamics of mud, the fabrication of cosmetics. The team is encouraged to come up with a plan to transfer its results and knowledge to the industrial or environmental sector.

The team should strengthen collaborations with other teams of the unit, especially teams 7 and 10.

The team should take the initiative to recruit a young assistant professor or CNRS fellow.

The team may consider a fusion with team 9 on magneto-rheology, which is thematically very close. Some joint publications already exist. Alternatively, a more significant role of Axe 3 could explore this proximity.

Team 9: Magnétorhéologie et nanométaux / Magnetorheology and nanomaterials

Name of the supervisor: M. Pavel KUZHIR

THEMES OF THE TEAM

The research activity of the 'Magneto-rheology and nanomaterials' is historically grounded in the field of electro- and magneto-rheological fluids, but it now encompasses other research topics (apparently weakly connected), such as the valorisation of industrial by-products and the collection of atmospheric water, that are motivated by the global issue of sustainable development. The team expertise ranges from fundamental physics to physical chemistry and even to chemistry and materials.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Aim for a greater homogeneity of publications within the team. Ensure that collaborations are developed within the new unit; The number of HDRs in the team should be improved;

It will be necessary to take care that the industrial contracts are not transformed into services;

The staff of the team should be more involved in the common life of the laboratory.

The team still somewhat suffers from a certain heterogeneity of production, an aspect that should be further improved. The team collaborates with other teams of the Institute, as illustrated by several common publications. Two members of the team have defended their HDR. The team hosts an engineer from a private company, which is the sign of a deep collaboration. Furthermore, the involvement of the team in the administrative life of the laboratory may need to be strengthened.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	-
Lecturer and associate lecturer	5
Senior scientist (Directeur de recherche, DR) and associate	-
Scientist (Chargé de recherche, CR) and associate	-
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	1
Subtotal permanent personnel in active employment	6
Non-permanent teacher-researchers, researchers and associates	9
Non-permanent research supporting personnel (PAR)	1
Post-docs	1
PhD Students	7
Subtotal non-permanent personnel	18
Total	24

EVALUATION

Overall assessment of the team

As its name shows, the 'Magneto-rheology and nanomaterials' team has strong, historical, expertise in the rheology of magnetic fluids and gathers some of the best experts of this topic in France. However, it presently faces the retirement of its elder members and therefore needs to renew its activity to some extent. The scientific production of the team is very good in terms of scientific articles (78 for only 3.5 ETPR, that is 3.7 publications/ETPR/year), published in classical journals that cover all aspects of its research activity. The team has secured excellent funding through various collaboration projects with industrial companies, both large and small, local and national. The visibility and attractiveness of the team are good, as shown by the large number of PhD students (2 PhD defences during the last term, eight were running during the assessment).

Strengths and possibilities linked to the context

The team has built an impressive expertise, over decades, on magneto-rheological fluids, and it enjoys worldwide recognition for this activity. The team has a large scientific output.

The team also develops two different interdisciplinary research topics at the frontier with (bio)chemistry, with interesting and significant results.

All these different research topics have raised much industrial interest that fuels the team's dynamics through (more than) adequate funding.

Consequently, the team attracts a large number of interns, PhD students, and visiting scientists.

Several members take part of various University teaching committees and, at the national level, of the CNU.

Several collaborations inside INPHYNI exist with teams 8, 10.

Weaknesses and risks linked to the context

The team 'Magneto-rheology and nanomaterials' presently gathers five permanent associate professors (3 of them hold their HDR) but no full professor and only one, recently retired, CNRS researcher who has been the main force in this team for a long time. The lack of senior researchers is not favourable to its activity.

The large spread of research topics that range from the historical activity on magneto-rheological fluids all the way to biopolymers makes it difficult to elaborate a common scientific culture. In this respect, the scientific strategy for the future, described in the written document, does not show much focusing.

Although the team is very well funded through industrial contracts and applied research programs, this creates the risk of losing sight of more fundamental issues. This lack of new 'groundbreaking' fundamental problems to tackle might explain the weakness in funding from the 'ANR programme blanc'.

Unfortunately, the expertise of the team in applied research is not yet exploited in terms of patents. There has been no recent hire in the team and recruitment should be given a high priority.

RECOMMENDATIONS TO THE TEAM

For better integration, the team members need to invent and foster original research topics, possibly led by new recruitment at CNRS, at the interface of magnetism and physical chemistry, which requires collective expertise. This is certainly challenging but the addition of talents could provide fruitful opportunities.

At least one more team member should defend the HDR and all should start to apply to full professor positions.

The collaboration network of the team should also be further expanded, both at the national and international levels.

Team 10 : Fluides complexes/ Complex fluids

Name of the supervisor: M. Christophe RAUFASTE

THEMES OF THE TEAM

The 'Complex fluids' team develops an experimental, numerical, and theoretical activity in a vast area of soft-condensed-matter physics, ranging from convection and hydrodynamic instabilities to wetting, propulsion and locomotion, and to granular materials and quantum dots. In addition to this wide spectrum of academic activities, the team has managed to build a fruitful collaboration with a local industrial company.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Previous recommendations: It will be necessary to tend towards a greater homogeneity of the rate of publication within the team; It will also be necessary to make sure that certain MCFs of the team are well associated with the various projects; It will be necessary to encourage the members of the team to pass their HDR; The dynamic lecturers of the team could be put forward more.

The scientific productivity of the team remains somewhat heterogeneous, an aspect that should still be improved.

For better efficiency, the number of research topics is being reduced but the full integration of all team members still appears to be a matter of concern.

Two members of the team have defended their HDR.

The most dynamic faculty members of the team have assumed important and visible administrative duties both within INPHYNI and at the University level.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	4
Senior scientist (Directeur de recherche, DR) and associate	-
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	7
Non-permanent teacher-researchers, researchers and associates	2
Non-permanent research supporting personnel (PAR)	-
Post-docs	1
PhD Students	3
Subtotal non-permanent personnel	6
Total	13

EVALUATION

Overall assessment of the team

With a permanent staff of seven faculty members and researchers (ETPR=3.5, not counting one recent recruitment), the team is involved in no less than ten research topics. Some of them are quite original and innovative. Overall, the scientific output, in terms of articles published in scientific journals, is very good in quantity (38 papers, i.e. 1.8 articles/year/ETPR) and excellent in quality, but is not equally distributed as some research topics seem to be more fruitful than others. The team enjoys national and even worldwide recognition, as illustrated by the award of a foreign distinction and multiple invitations at international conferences and for long-term stays abroad. The team is well funded thanks to many ANR contracts, which illustrates the high quality and originality of its research. Five PhD theses have been defended during the last term, including one funded by a company.

Strengths and possibilities linked to the context

The 'Complex fluids' team has an outstanding scientific production that covers original research topics.

The experiment/simulations/theory cocktail is an important asset that should provide interesting opportunities for comprehensive studies.

Some of the team members benefit from a high visibility, which should help attracting even more students. Two members of the team were appointed to the Institut Universitaire de France (IUF), a high mark of recognition.

The team provides staff for senior responsibilities, both at the laboratory and at university levels.

The team is very successful in calls of the ANR funding agency and has some industrial outreach.

Weaknesses and risks linked to the context

The perimeter of the team results from the merging and restructuration of previous teams during the fusion, which results in some heterogeneity of productivity and visibility among the different topics.

There are probably too many topics, some of them seemingly almost unrelated, given the number of the permanent team members. Building a common research objective remains a pending challenge.

Although two members recently defended their HDR, a couple of them still have no HDR.

One active member of the group takes large responsibilities as director of the graduate school SPECTRUM.

RECOMMENDATIONS TO THE TEAM

The 'Complex fluids' team is encouraged to focus on the most fruitful and original research topics.

Most importantly, the team members need to build a common culture, making sure that each member feels part of it.

Some are engaged in large administrative duties, and need to find the difficult balance between these engagements and spending time to help defining the scientific perspective of the team.

Team 11 : Physique non-linéaire et hors-équilibre / Out of equilibrium and nonlinear physics

Name of the supervisor: M. Sergey NAZARENKO

THEMES OF THE TEAM

This team houses a very broad range of topics that can indeed be summarised by its name. Numerical simulations of fluid mechanics of how fungi spores survive turbulent journeys (an activity that moved from team 7 and has already left team 11), a large variety of applications of wave turbulence (in particular of gravitational waves in the early universe), systems biology, i.e. the computational and mathematical modelling of (information transfer in) complex biological and biochemical networks, simulation and experiment of electronic solitons in semi-conductors, and the growth of silicon germanium on vicinal (stepped) surfaces.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

There is a clear risk of dispersion of efforts.

This is still the case. Actions are still disconnected.

The low international visibility is not in line with the great recognition of the group's publications

Some team members have large international visibility, e.g. via an International unit (LIA, with also team 1) in Argentina, one ERC and a precious Simon's collaboration.

As part of the research is related to industry, it would be relevant to respond to calls for Marie Curie grants

No actions in this direction have been identified.

WORKFORCE OF THE TEAM

Permanent personnel in active employment	
Professors and associate professors	2
Lecturer and associate lecturer	1
Senior scientist (Directeur de recherche, DR) and associate	1
Scientist (Chargé de recherche, CR) and associate	2
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	-
Research supporting personnel (PAR)	-
Subtotal permanent personnel in active employment	6
Non-permanent teacher-researchers, researchers and associates	3
Non-permanent research supporting personnel (PAR)	-
Post-docs	1
PhD Students	1
Subtotal non-permanent personnel	5
Total	11

EVALUATION

Overall assessment of the team

The scientific activities are excellent. The activity on turbulence is an historic activity of former INLN and with the recruitment of a confirmed researcher this activity has been brought back successfully to Nice. Nevertheless, the team itself has gone through some turbulence. The former team leader moved to team 10, one strong topic (fluid mechanics of fungi) moved from team 7 to team 11 before leaving INPHYNI with ERC at the time of writing. The team does not give the appearance of having defined an internal coherence with shared strategy. Six theses have been defended during the evaluation period and 65 articles have been published (around 10 with double affiliation to the team due to above movements), that is 2.2 per year per ETPR.

Strengths and possibilities linked to the context

The team has a very good scientific production, a largely increased international visibility, a very good funding that, however, is mainly devoted to individual group members.

Different team members are active in the organisation of scientific events.

The studies on Fungi spore spread (rewarded by CNRS medal and ERC) and wave turbulence (boosted by an external DR opening at CNRS in 2017 and a recent hire of an associate professor by UCA) make together almost half of the team's production and both belong to the world top.

The team may benefit from the arrival of two new members in the Nice area that ask for a mutation.

Weaknesses and risks linked to the context

Despite the high scientific quality, the team comprises several highly individual and disconnected actions, supported by a few ETPR at the most. Its common auto-evaluation report was quite brief (in both width and depth) and technical, and some interesting works found in the list of publications do not seem to have been mentioned (e.g. 'A biophysical model explains the spontaneous bursting behaviour in the developing retina', published in Scientific Reports).

It is not clear that the dominant funding obtained in the team (ERC, Simon's foundation) benefit to other team members; the richness is not equally spread. A clear team strategy to go together is recommended.

The activity on systems biology – published in journals on biochemistry and biological mathematics – is of high quality and originality but at the same time rather fragile and disconnected from any other activity in INPHYNI.

A risk of topical isolation exists. The activity on fungi spores has left INPHYNI and this will severely lower the scientific output of the team.

RECOMMENDATIONS TO THE TEAM

The committee recommends the team to act as a team, to formulate a common strategy in which all different members find themselves.

One member works in biology and is involved in EUR LIFE. It is vital to support his activity and it may be necessary to look out for new recruitment to support biological systems and semi-conductor solitons.

A platform on turbulence is in preparation and one has to make sure that technical staff is available to run it.

CONDUCT OF THE INTERVIEWS

DATE(S)

Start: 12 December 2022 at 09h00

End: 13 December 2022 at 19h00

Interview conducted: on-site

INTERVIEW SCHEDULE

lundi 12 décembre : Plaine du Var

08h45 – 09h00 : Présentation du comité et du programme

09h00 – 10h00 : Présentation du DU devant le comité, les tutelles et le personnel & visio

10h00 – 10h30 : Questions du comité et échange & visio

Huis-clos et pause

10h45 – 12h15 : Exposé de 3 équipes (1h30) & visio

- équipe MNM (Magnetorheology and nanomaterials)
- équipe WaCS (Waves in complex systems)
- équipe NENP (Non-equilibrium and non-linear physics)

Huis-clos et pause

Pause déjeuner

12h30 - 14h00. Buffet – posters. & visite du lieu

14h00 - 14h45 : Échange comité – PAR (ITA/BIATSS) & visio

14h45 – 15h45 : Exposé de 2 équipes (1h00) & visio

- équipe CA (Cold atoms)
- équipe CSR (Concentrated suspensions rheology)

15h45 – 16h30 : Échange comité – Doctorants et Postdocs & visio

Huis-clos et pause

17h00 – 18h00 : Exposé de 2 équipes (1h00) & visio

- équipe FOA (Fiber optics and applications)
- équipe CF (Complex fluids)

Mardi 13 décembre : Valrose le matin – Sophia l'après-midi

8h45 – 9h45 : Exposé de 2 équipes (1h00) : de préférence 2 équipes de Valrose & visio

- équipe QPI (Quantum photonics and information)
- équipe MIMIC (Microfluidics, physical chemistry and biology at interfaces)

Huis-clos et pause

10h15-11 h 45 : Visite de manip/services/plateforme (1h30) en 2 groupes

- Groupe 1 : MNM, FOA, MIMIC (20 minutes/groupe + 20 minutes déplacement)
- Groupe 2 : CF, WaCS, CSR, QPI (20 minutes/groupe)

transfert & Pause déjeuner ; **Transfert vers Sophia**. Plateaux-repas

14h00 – 14h45 : Échange comité-tutelles & visio

14h45 – 15h45 : Exposé de 2 équipes (1h00) : de préférence 2 équipes de Sophia

- équipe M_CoPS (Complex photonic systems and materials)

- équipe TP (Theoretical physics)

Huis-clos et pause

16h15-17 h 00 : Échange comité – C/EC & lien visio

17h00 - 17h45 : Visite de manip/services/plateforme (45') en 2 groupes

- Groupe 1 : CA, M_CoPS_A (20 minutes/groupe)
- Groupe 2 : M_CoPS_B, CF (20 minutes/groupe)

17h45-18 h 30 : Échanges comité – Direction (& future direction) & visio

Mercredi 14 décembre : Valrose

9h00-12h00: *huis-clos du comité* & visio

PARTICULAR POINT TO BE MENTIONED

None.

GENERAL OBSERVATIONS OF THE SUPERVISORS

Institut de Physique de Nice
UMR 7010, CNRS & Université Nice Sophia Antipolis
17, rue Julien Lauprêtre, 06200 NICE, France

A l'attention du Haut Conseil à
l'Évaluation de la Recherche et
de l'Enseignement Supérieur

Nice, le 13 juin 2023

Objet : Observations de portée générale (DER-PUR230023171 - INPHYNI - Institut de physique de Nice)

Nous souhaitons remercier l'ensemble du comité HCERES pour son travail, son analyse et son évaluation de l'Institut de Physique de Nice. Les points forts et points faibles du comité seront analysés avec précaution et seront particulièrement utiles pour consolider le futur de l'Institut.

L'Institut de Physique de Nice n'a pas d'observations de portée générale à formuler.


Pour l'Institut de Physique de Nice


Guillaume HUYET
Directeur
INSTITUT de PHYSIQUE de NICE
CNRS UMR 7010

Nice, le 17 juillet 2023



**Direction de la
Recherche, de la
Valorisation et de
l'Innovation**

Mme Johanna ZERMATI
Directrice

 drvi-recherche@univ-
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à l'attention du Haut Conseil à
l'Evaluation de la Recherche
et de l'Enseignement Supérieur

Affaire suivie par :
Mme Delphine ISCAYE
Gestionnaire

 04 89 15 16 44
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Objet : Observations de portée générale

Veuillez trouver ci-après les observations de portée générale d'Université Côte d'Azur concernant l'unité **DER-PUR230023171 - INPHYNI - Institut de physique de Nice**.

Université Côte d'Azur tient à remercier l'ensemble du comité HCERES pour le travail, conséquent et de qualité, d'analyse et d'évaluation des activités de l'unité INPHYNI. Les appréciations et recommandations du comité sur les différents domaines d'évaluation sont très utiles pour positionner les activités de l'unité et apporter des éléments sur lesquels s'appuyer pour consolider la vision prospective de l'unité.

L'établissement n'a pas d'observations de portée générale à formuler.



Pour le Président d'Université Côte d'Azur
et par délégation,
Le Vice-Président Recherche et Innovation

Ndel DIMARCO



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