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COMITÉ EXOPLANÈTES TRANSVERSE : PRESENTATION AND SURVEY RESULTS

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Abstract. This proceeding of the French Astronomical Society annual meeting introduces the "Comité Exoplanètes Transverse" (CET), an institutional cross-cutting committee for the French exoplanets community which was created in fall 2020. We first present the composition, missions, and current organisation of this committee. An assessment of the first two years is presented. The second part of this document is devoted to the survey of the French exoplanet community recently performed by the CET. The objective of this survey was to build a factual and as exhaustive as possible overview of the French exoplanet community, in particular in terms of research activities, resources, prospective, and connections with other communities. A second objective was to gather inputs from the community about the CET organization and future evolution.

Keywords: exoplanetary systems

1 Introduction: motivation

The "Comité Exoplanètes Transverse" (CET) was created by the Institut National des Sciences de l'Univers (INSU/CNRS) in September 2020 following the prospective (`https://www.insu.cnrs.fr/sites/institut_insu/files/news/2021-04/Prospective_INSU_AA_2019.pdf`) performed in 2019, to fulfill the request of an important part of the French exoplanet community to have a National Program dedicated to this thematic, which is currently for the largest part included in the PNP (Planetology National Program) with strong interfaces with the PNPS (Stellar Physics National Program), PCMI (Interstellar Medium National Program), PNST (Solar-Terrestrial National Program). In addition to those research programs, there is also an interface with the transverse committee ASHRA (High Angular Resolution Specific Action). The CET was then created as a transverse committee between these existing structures. We first present the committee in Sect 2. As part of our first actions, we performed a survey of the french community between November 2021 and January 2022: a few selected results from this survey are presented in Sect. 3. We conclude in Sect. 4 with final remarks on the role of the CET.

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2 Presentation of the CET

The CET was created as a structure transverse to existing National Progams and Actions, and as such is composed of members of the corresponding existing scientific councils (hereafter SC), selected for their expertise in various fields of exoplanet studies. As of June 2022, current members are: all members of the theme 1 "Exoplanetary systems" of the PNP SC (I. Boisse, S. Charnoz, T. Guillot, Q. Kral, M. Turbet, O. Venot), 4 members of the PNPS SC (C. Baruteau, X. Bonfils, M. Langlois, N. Meunier - current coordinator of the CET), 1 member of the PNST SC (A. Strugarek), 1 member of the PCMI SC (E. Chapillon), 2 members of the ASHRA SC (E. Choquet, D. Mary). Previous members until January 2022 were J.-C. Augereau, A. Cassan, A. Crida, G. Danger.

The missions of the CET are of two types. It is in charge of giving a scientific assessement on funding proposals to the National Programs on the exoplanet thematic. At this stage, only applications requesting funding by at least two PNs are evaluated by the CET, otherwise they are evaluated only by the corresponding PN. There is no budget associated to the CET, so our recommandations to fund or not a project are of scientific nature, and we therefore propose (and do not decide) a budget per PN for each proposal. In a similar way, we also provide an assessement for other applications, for example National Observation Services (SNO) evaluations, or proposals to fund instrumental contribution. In all cases, our assessements are communicated to the PNs (and not directly to INSU), which are then integrated in the PNs' final report.

The second mission of the CET is related to the animation of the community, and in particular to organise the scientific prospective on exoplanets. In this domain, our main action so far has been to organise a survey of the community, described in detail in the next section.

We consider our organisation to be satisfactory on several points. Exchanges within the committee, coming from different scientific councils with possibly different views, are positive, and in most cases our recommandations are followed. There have however been some budget decrease of the allocated budget with respect to our recommandations in a few cases, sometimes due to global budget constraints when comparing with all other proposals.

However, this organisation presents some difficulties, of two kinds. A first one is a practical one, related to the fact that the CET is an additional transverse structure: timelines are very short compared to the usual National Program organisation, especially for the proposals to be processed during the fall term, since our examination of the proposals must take place between already fixed time constraints. This is also the case for punctual proposals, for which the delays are usually short. There is a certain level of duplication in meeting discussions (although referees on the proposals are similar for the CET and the different scientific councils). The second type of difficulty is more profound. First of all, this organisation depends on the PN's directors, since they are in charge of transfering the relevant proposals to us. In addition, since we examine only the proposals which are transverse, there are many projects concerning exoplanets that we do not see because they are processed by one of the National Program scientific councils only. As a consequence, we have a very partial view of the community, and may miss information or proposals.

3 Summary of the survey: overview of the French community

We implemented this survey to establish a global, as exhaustive as possible, view of the French community working on exoplanets. The committee started its work only recently, and it was necessary for us to know better this vast and very diverse community, which also has many interfaces with other communities. In addition, it was interesting to do this now in order to better prepare for the prospective exercice organised by INSU in 2024. Also, several programs have organised an assessement of the current situation for the different thematics, also in preparation of the final assessement in 2024.

Our objective was therefore to build a factual panorama of the thematics, approaches, means, instruments, ... developed by the french community. The survey was strongly biased towards evaluating the current situation rather than on future prospects themselves. We took particular care to identify the interfaces with other communities (inside the astronomy-astrophysics domain, within INSU and outside). Our objective was not to establish priorities at this stage.

The survey was opened to the community between November 2021 and January 2022, and concerned the 2018-2021 period. We received 135 usable answers (the others were incomplete). It concerned permanent researchers, PhD candidates, postdoctoral researchers, and engineers who are or were in a French laboratory

during that period. We know that the list of persons answering the survey is incomplete, in particular for early-career researchers and engineers, but it is sufficient to derive from this first survey a statistical analysis of the results. 27% of the respondents were women and 73% were men, with less women among the permanent researchers (18%, below the average in the french astronomy community, which is of 23%) and higher for PhD candidates and postdoctoral researchers. We present a selection of results here, and the full report is available on `https://pnps.cnrs.fr/tte.html`.

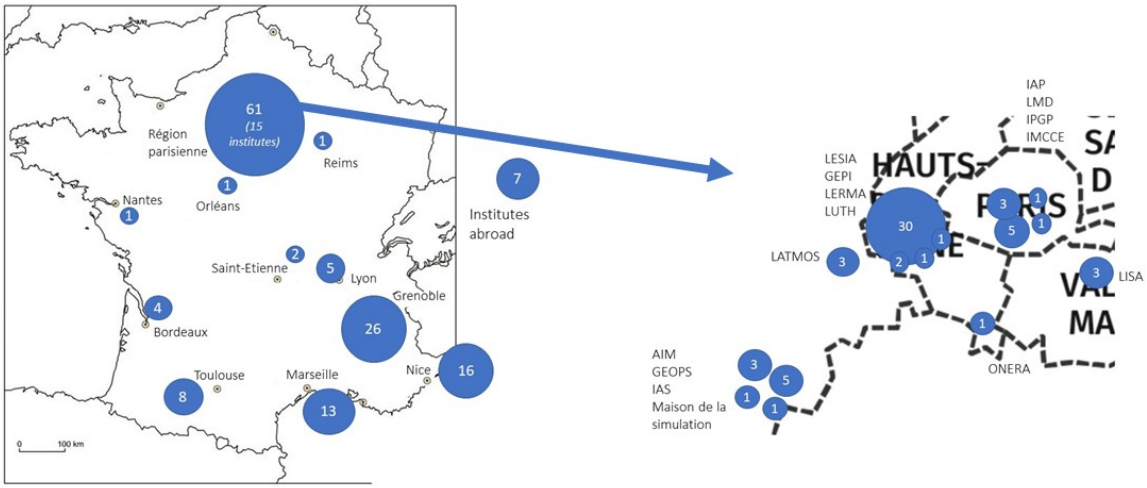

Fig. 1. Left: Geographical repartition of the french exoplanet community. **Right:** Zoom on Paris and its surroundings.

The French exoplanet community is present in 25 laboratories in France (Fig. 1), at very different levels: from one person in a few laboratories up to 30. 7 persons were abroad when they filled the survey.

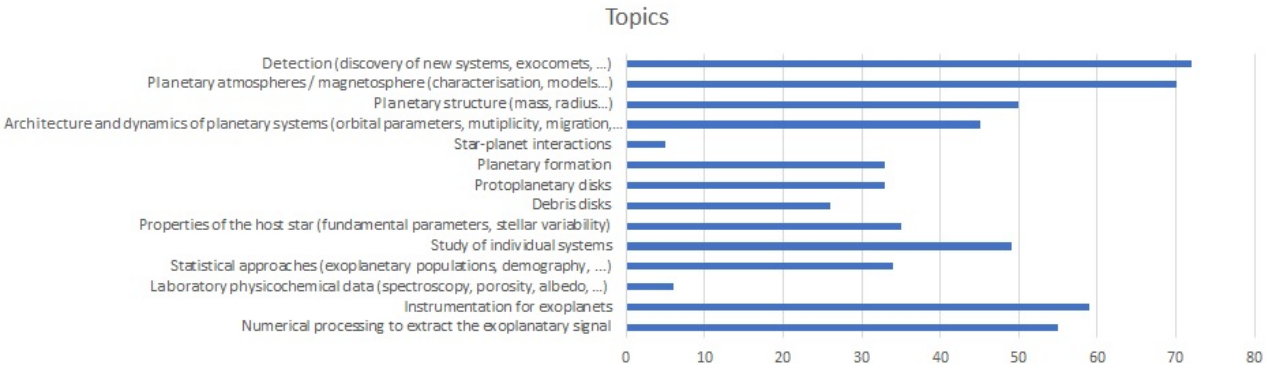

Fig. 2. Number of answers per thematic. Several answers were possible.

The community covers all approaches: observations and data analysis, models and theory, instrumentation and laboratory experiments. Many people are involved in at least two of those approaches. They also use different methods, again with a large fraction using two or more : radial velocity, photometric transits, direct imaging, astrometry, interferometry, gravitationl lenses, polarimetry, radioastronomy, laboratory spectroscopy, hydrodynamical simulations, N-body simulations, and theory. The range of thematics covered by the community is illustrated in Fig. 2. An important point is that all are interconnected, in the sense that there is no respondant working on only one of these thematics.

We asked several questions concerning the interface with other communities. A summary is illustrated in Fig. 3. We found a very strong interface with the three other thematics in planetology which focus on different aspects of our solar system (right panel), stellar physics and high angular resolution. The interface with the stellar physics perimeters concerns all thematics (stellar formation and protoplanetary disks, magnetic field and stellar activity, stellar structure and atmosphere, interactions). After a correction based on an iteration with

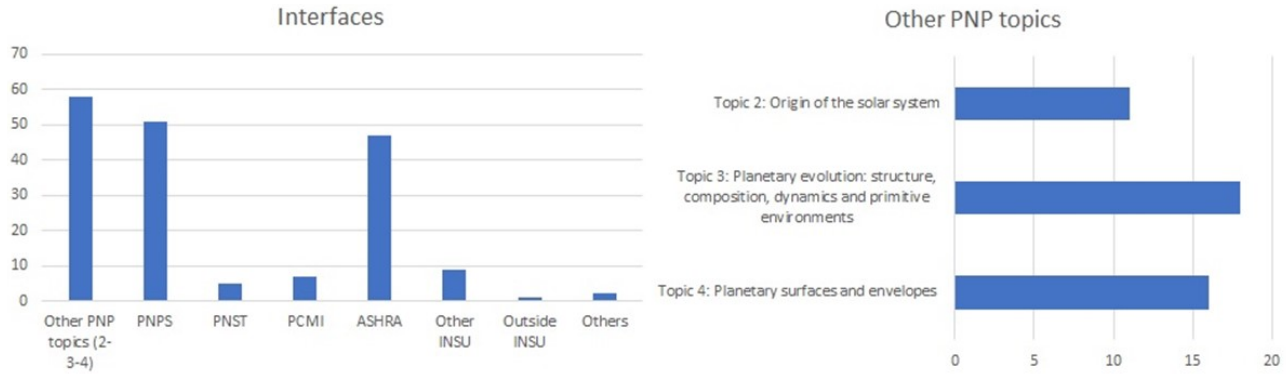

Fig. 3. Left: Interface with National Programs and other communities. **Right:** Interface with other themes of the Planetology National Program.

some of the respondents, we identified that the persons at this interface were working on both exoplanets and solar system bodies, representing a strong interface. A smaller proportion of people had only a weak interface between the two thematics, essentially in terms of interest for the thematics they were not directly working on.

The community uses many facilities (we listed 28 ground-based facilities and 8 space missions) covering the whole range in size, from team instrument to large spatial missions. This includes national and international ground-based facilities, as well as high performance computing facilities. The same is true for the instruments which will be the most used in the next 5 years, with a list of 48 instruments (a maximum of 3 answers per person were asked). This goes along with a strong implication in the developement of instruments relevant for exoplanet studies, including many responsabilities (principal investigator or co-I and co-PI, project scientist, project manager, instrument scientist...): we listed 20 persons with responsabilities, some of them on more than one instrument, to be compared with the 85 permanent researchers who filled the survey.

We listed the different funding ressources, coming from many different origins at different levels, including 14 ANR (Agence Nationale pour la Recherche) and 15 ERC (European Research Council). 94 PhD thesis were listed, either as main advisor or co-advisor, covering totally or in part only the 2018-2021 period (note that some of those PhD candidates are abroad with a co-advisor in France). Finally, 30 persons indicated an implication in 15 national observations services, for the most part instrument-related or on databases.

4 Conclusion: role of the CET

We collected through this survey some inputs on the organisation and mission of the CET. They can be summarised as follows:

- The CET should play a role in the formation of an exoplanet National Program, and in structuring the community. Arguments in favour of such a dedicated program were given in the answers to the survey and will be considered in future discussions on this subject.
- Several communication tools were suggested, out of which we have selected for short term actions the re-activation of a french exoplanet mailing list, and the implementation of a dedicated website for a better visibility.

The CET has been or will be presented at meetings dedicated to different communities (stellar physics, planetology, interstellar medium), where such projects are discussed. We will also be involved in organising the community during the 2023-2024 prospective, including a new survey for the 2022-2023 period, in order to prepare for possible future evolutions of the CET organisation and missions.