
SPANet Radio Astronomy Workshop

IAG-USP, 28th September 2017

Final Report

Goals

The SPANet Radio Astronomy Workshop goals were **(i)** to improve the networking among researchers in the field, in particular **(ii)** to encourage the active participation of younger researchers, **(iii)** to disseminate the work that is being done in the field, and **(iv)** to discuss possible actions to boost the development and visibility of the field.

About the Participants

Among the 51 participants of the workshop, we had researchers at all levels, from undergrad students to experienced researchers (see **Fig. 1**).

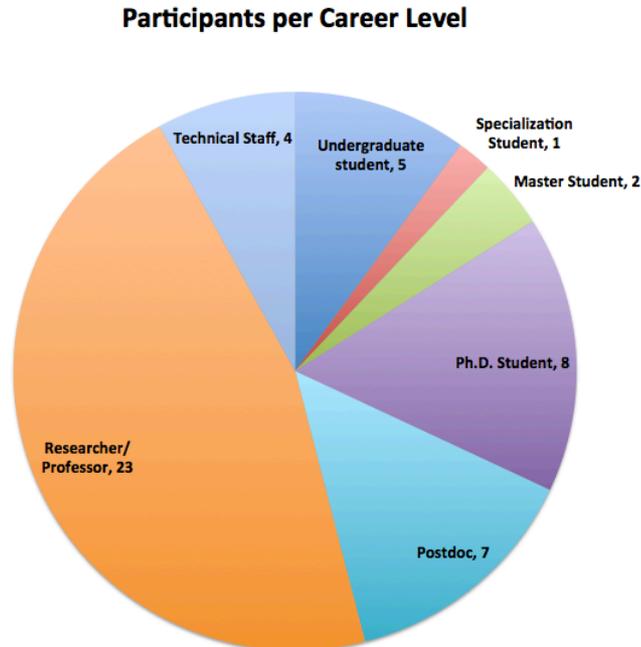


Figure 1 – Number of participants registered in the workshop per career level.

The São Paulo State has a long relationship with Radio Astronomy, with extensive experience already accumulated in several institutions across the State. In our Workshop, we had 6 institutions from the São Paulo State represented, comprising 77%

of the participants (see **Fig. 2**). In addition, we had participants from institutions in other Brazilian States, and 4 participants with international affiliation(s).

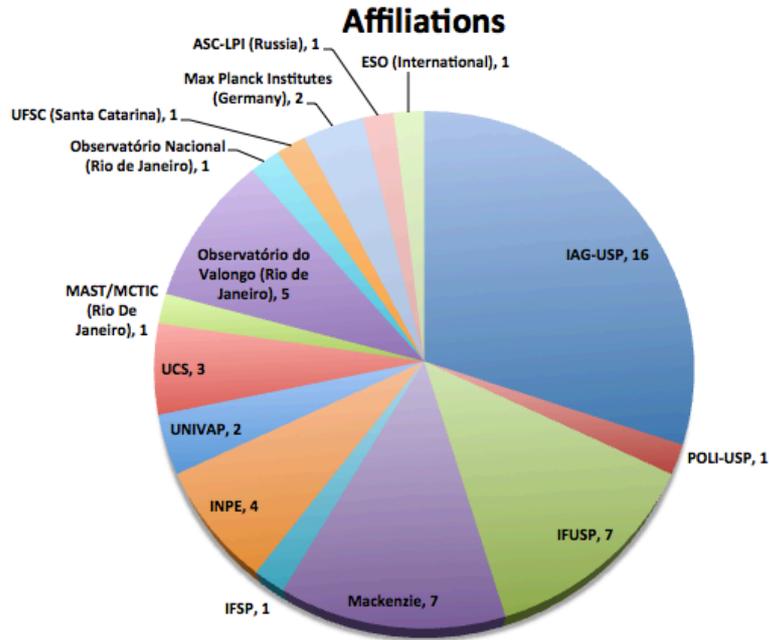


Figure 2 – Number of participants per affiliation.

Talks

This one-day (9 a.m. to 6 p.m.) workshop included several talks and ample time for discussions (more than 2 hours), including a plenary session. The morning sessions were devoted to the current and future Brazilian radio astronomy facilities, while the afternoon talks were focused on scientific research projects. The full program, as well as the talks slides (and this report), can be downloaded from our website¹.

Providing the Context: Prof. Laerte Sodré opened the Workshop, providing an introduction to the São Paulo Astronomy Network (SPANet) and its goals. This talk was followed by a short overview of major international facilities and some new observational paradigms and challenges of the modern international radio astronomy.

Facilities – Past, Present and Future: Two talks were devoted to the future LLAMA and BINGO radio telescopes. These twenty-minute talks briefly discussed the project goals, described the antennas, and provided the status of their construction. The following talks described and gave the status of the Brazilian Decimetric Array (BDA) lead by INPE and the many facilities and collaborations that CRAAM-Mackenzie

¹ <http://www.radioastronomia.net/en/>

manages or is involved, in particular the ones devoted to solar research. A review of the rich history of the Itapetinga Radio Observatory (ROI) showed examples of the many discoveries made there. The antenna is not functional at the moment, but there is an ongoing effort lead by researchers from INPE and Mackenzie (with the collaboration from other institutions) to bring back ROI into full operational again. In the afternoon session, a couple of instrumentation talks addressed technical projects for LLAMA and BINGO telescopes.

Our Goal is Science: In the afternoon session, short presentations discussed finished, on going, and future science projects. A wide range of scientific topics in Astronomy were covered: high-precision astrometry, our Sun, effects of exoplanet transits on the stellar emission, the interstellar medium of our and other galaxies, star formation, galaxies, large-scale structures, and cosmology. Most of the presentations included or were largely devoted to suggestions of future studies that explore the new radio facilities.

Summary of the Discussions

Although part of the discussions during the day were on details on individual projects it was clear, especially during the plenary discussion, that some topics were major concerns.

1) The New Paradigm: The new facilities now aim to be accessible to astronomers in general, not only to the radio astronomers, specialists fully dedicated to the field. This important change in paradigm was mentioned several times in different contexts and clearly should be considered when planning facilities, research projects, and training for present and future Radio Astronomy.

2) Necessity of Engineers: It was mentioned that there is a difficulty to find engineers and scientists willing to work on technical aspects of instrumental projects. One possible solution for this issue would be changing the mentality of FAPESP and other funding agencies about approving and funding fellowships for such individuals/projects. It was also mentioned that some criteria for productivity report evaluation would need to be revised. For example, criteria related to publication rate, considering that such projects may not produce scientific results until the instrument is fully functional. It was suggested that students from the Engineering Courses could be motivated and attracted to work in instrumental projects.

3) ROI: As mentioned above, the ROI antenna is not working at the moment. This antenna was very important to the Brazilian Radio Astronomy development for many years. As mentioned by several participants, if fixed, it still has great potential for producing new Science and for training of the younger generation of radio astronomers.

This would be very important to maintain and increase our level of expertise in the field and to train future researchers to fully explore the current and new radio facilities. Recently, researchers from INPE and Mackenzie, with the collaboration of other institutions, have started an effort to make ROI fully operational again. A committee has been established and a document to support this project is being written (for the managing institutions and possible funding agencies). A private company was hired to assess the status of the antenna. Prof. Laerte Sodré suggested that Engineers/Technical staff from USP could collaborate.

4) Training: Training new radio astronomers and other researchers to use radio facilities was a concern of a number of participants, in particular, to make better use of the new radio telescopes (LLAMA, BINGO, etc.). It was suggested the organization of practical workshops/schools and specific courses. Emphasis was given that these courses should aim that the participants should, at the end, be capable to effectively propose and do radio observations. It was noted that IAG organizes courses on Radio Astronomy from time to time and Mackenzie offers a regular graduate course every year. Also a few short schools have been organized along the last two decades. A few participants recommended inviting ESO specialists to offer courses (this has been done before successfully) and the participation in the IRAM and ESO workshops and schools.

5) Organization and Planning: Several researchers suggested the need of improving the organization and planning inside the Radio Astronomy community. With this aim, it was suggested:

- The creation of a Radio Astronomy researchers network. From the discussions, the creation of a type of (not hierarchical) network of researchers was suggested.
- The creation of a mailing list for future discussions was also suggested.
- The development of a webpage (Wiki?) with current facilities and projects, as well as published papers and expertise.
- The organization of regular meetings and seminars. Online streaming would be useful, as is done in IRAM.
- An INCT for Radio Astronomy.
- The development of a long-term plan for the field.

There was a discussion if these initiatives should be only for SP State researchers or they would be open for any researcher. Participants from other states showed interest in participating. Suggestions were made to keep a local smaller structure, at least in these first moments. It was also suggested that this network could have State “nodes” to ease the organization, but with possible connections through collaborations. Any national wide initiative should involve the Brazilian Astronomical Society (SAB).

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