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PROAM COMMISSION OF THE SPANISH ASTRONOMICAL SOCIETY

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Abstract. Since 2009, the Spanish Astronomy Society has maintained a dedicated working group (called ProAm Commission) to foster the relationship between professional and amateur astronomers. This Commission assessed the state of ProAm collaboration in Spain in 2021 and then again in 2023. Data for the reports were gathered from recent amateur astronomy conferences, a thorough review of scientific publications involving participation of amateur astronomers, and two surveys targeting both amateur and professional communities. The reports highlighted that Spanish amateur astronomers are actively collaborating with professionals. To date, they have participated in over 200 peer-reviewed scientific articles and in nearly 5,000 astronomical circulars. However, the reports also revealed a notable gender disparity: only 4% of professional and 7% of amateur contributors in these collaborations are women. Lastly, both amateur and professional communities expressed a need for better communication channels. Here, we will present a brief summary of the status of the Proam collaboration in Spain and the measures taken during the last years by the SEA ProAm Commission to try to solve the gender gap and the lack of communication, and to promote new and better collaborations.

Keywords: collaboration, proam, Spain

1 Introduction

The participation of amateur* astronomers in astronomy and astrophysics research has been increasing in recent years. More and more contributions are being made from the amateur field in some of the investigations led by different institutes, research centers, and universities. The examples are numerous and cover aspects as diverse as planetary sciences, observation of minor bodies, variable stars, exoplanets, galaxies, supernovae...

Thanks to the recent technological advances, the relative accessibility of advanced astronomical instrumentation for the amateur astronomers, and the fact that astronomical software tools are often designed and developed by amateurs, their contribution is becoming decisive in certain fields of astronomy, for example, in those where the availability of observing time is key both for the continuous follow-up of certain objects and for the possibility of increasing the integration time for faint objects.

This synergy between professional and amateur astronomy forms what is known as *Proam collaboration*†.

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*In this text, an *amateur astronomer* is defined as someone who has no salary related to astronomy, regardless of the level of knowledge and experience.

†We differentiate Proam collaboration from *Citizen Science*. In the Proam collaboration astronomy stands out as a significant hobby for the non-professionals involved in the project, and usually implies having certain knowledge, equipment and/or experience in astronomy.

Since 2009, the Proam Commission of the Spanish Astronomical Society (SEA for its Spanish acronym) aims to serve as a link between both communities, the professional and the amateur, facilitating resources and tools between both, and making visible the results that this fruitful contribution generates in Spain.

2 Activities of the Commission

Since its inception, our Commission's main activities have been:

2.1 Conferences & Meetings

One of the ways in which our commission seeks to enrich and strengthen the astronomical community is through the organisation of meaningful conferences and meetings. These events not only provide a platform for the exchange of knowledge and experiences between professionals and enthusiasts in the field, but also foster opportunities for collaboration and continuous learning. In this regard, we have participated in the organisation of several National Astronomy Conferences (CEA from its Spanish acronym) which can bring together up to 200 people: CEA-2021 in A Coruña, CEA-2023 in Zaragoza, and CEA-2025 in Aranjuez. In addition, together with local astronomy associations, we have organised several Proam Conferences where the latest scientific developments and discoveries made by astronomy enthusiasts are shared: Proam-2015 in Jaén, Proam-2019 in Huesca, and Proam-2024 in Donostia-San Sebastián.

2.2 Javier Gorosabel Award

The SEA ProAm Commission, with the support of the Boards of SEA and FAAE (Federation of Astronomical Associations of Spain), coordinates the *Javier Gorosabel Award for ProAm Collaboration in Astrophysics*[‡]. The aim of this contest is to reward excellence in collaboration between professionals and amateurs in astronomy in Spain, and is announced biennially. To date, three editions have been held: 2018, 2022 and 2024 (covid prevented the 2020 edition). The awarded projects and collaborators were:

- **2018:** Ex aequo award to David Martínez-Delgado (Max Planck Institut für Astronomie) and Ricardo Hueso (Universidad del País Vasco) for long-term Proam collaborations.
- **2022:** Javier Peralta (Universidad de Sevilla) and Emmanuel Kardasis for the project *Astronomers "on the hunt" for the Venus discontinuity.*
- **2024:** Enrique Díez Alonso (Instituto de Ciencias y Tecnologías Espaciales de Asturias) and Sociedad Astronómica Asturiana Omega for the project *K2 OjOS to detect and characterize extrasolar planets.*

This award also pays tribute to Javier Gorosabel (1969-2015) who, in addition to being an excellent professional astrophysicist, worked side by side with several groups of amateur astronomers. To this end, the SEA's Proam Commission, together with Eibar Town Council, organises the Javier Gorosabel Astronomy Meetings in his hometown, where the winners briefly present the award-winning project to the general public. These meetings are an excellent opportunity to promote scientific dissemination and thus encourage scientific and technical vocations among young people.

3 Assessment of the Proam Collaboration in Spain

However, many questions arise when we approach the Proam collaboration: how many amateur people participate actively in Proam projects? how many professionals promote these collaborations and make use of the data obtained in them? what are the fields of astronomy that are most favored by Proam participation? what are the shortcomings of this type of collaborations? how important is this collaboration within all the progress in the field of astronomy that is developed in Spain?

These questions had no answer, or at least no definite answer, until 2021. The 'Proam Situation in Spain' report attempted to shed light on some of these questions.

[‡]This award is sponsored by the Sociedad Española de Astronomía, Instituto Astrofísico de Canarias, Observatorio de Calar Alto, Observatorio Astrofísico de Javalambre, Parc Astronòmic Montsec, Observatorio de Sierra Nevada, and Eibarko Udala.

3.1 2021 report

In order to x-ray and evaluate the situation of this collaboration, we decided to explore different ways to obtain the answers to the above questions. We collected data from the Proam Conferences organized so far, and numerous scientific publications were compiled thanks to the participation of amateurs. In addition to these sources of information, the survey 'Study of Proam collaboration in astronomy' was published in April 2021, which formed a large part of what was presented in the report.

The survey was designed to be answered by people belonging to the two main areas of this collaboration: the professional and the amateur. It was distributed through SEA and FAAE, and about 150 people responded to it.

Based on the survey responses and data obtained at various Proam conferences, we found around 100 active amateurs in Spain, whose collaboration is reflected in scientific articles, astronomical circulars, and conference communications. In addition, 20 amateur groups involved in Proam collaboration projects were identified.

The most relevant areas of Proam collaboration in 2021 were the study of minor bodies in the Solar System (asteroids, comets, meteors, meteorites, etc.) and variable stars (including supernovae), which coincide in the responses of both amateurs and professionals. This is possibly linked to the accessibility of observation techniques by amateurs, enabling them to participate in these projects.

The percentage of women active in astronomy is 28% for professionals and 24% for amateurs in Spain, according to SEA's and FAAE's studies. These figures have remained basicaly unchanged since 2002. According to our surveys, women who collaborate account for 7% in the amateur field and only 4% for professional collaborators. These figures are very low and show a clear gender gap.

A curious piece of information gleaned from the surveys was that a significant proportion of Spanish amateurs participate in Proam projects outside our country, and a significant proportion of professionals also collaborate with non-national amateurs. This lack of national collaboration between professionals and amateurs could be related, at least in part, to the demand for information from the amateur comunity on Spanish professional projects requiring Proam collaboration (a request frequently repeated in the survey).

With regard to the Virtual Observatory (VO), although the proportion of amateurs who use the VO and its tools was significantly lower than that of professionals, the percentage of interest in training related to the VO was similar. The professional community showed greater interest in VO catalogues and spectra than the amateur community, while interest in VO images is slightly higher among members of the amateur community. In both fields, the percentage of people interested in sharing their data with the VO is low (19%).

3.2 Measures Taken

Following the initial assessment, the SEA Proam Commission launched a set of strategic measures to strengthen and enrich the ecosystem of collaboration between professionals and amateurs. These measures aimed to overcome the challenges identified in three critical areas: expanding the dissemination of proam collaborations to attract new participants; focusing on the collection and distribution of detailed information on projects and available resources to maximise the efficiency and results of these collaborative efforts; and strengthening communication channels between professionals and amateurs to foster greater motivation and maintain a high standard of quality in joint results.

Firstly, we launched a webpage dedicated exclusively to proam collaboration in Spain, designed as a comprehensive resource that not only served to provide information on current and future events and projects, but also acted as a meeting point for the community, offering a wide range of useful resources for both groups. In addition, a series of monthly talks and information sessions were organised with a dual purpose: to increase the visibility and recognition of proam collaborations and to highlight the crucial role played by amateur contributions in this field. To address the need for specific training highlighted in the responses to the 2021 survey, 6 tailored training courses were coordinated and offered to provide participants with the tools and knowledge necessary to contribute effectively to proam projects. Finally, a code of conduct was developed to establish a framework of respect and cooperation among those participating in these projects.

3.3 2023 report

In 2023, we conducted an in-depth assessment of the impact of these measures and re-examined the situation of proam collaboration in Spain with an updated perspective. However, the 2023 surveys revealed low overall participation, which is an area of concern that needs to be addressed for future assessments.

Despite this, we found a growing trend towards the incorporation of amateurs into professional research and a notable increase in female amateur participation, which is a positive indicator of inclusion. The surveys data showed consistency in the types of collaboration, the instruments used, and the forms of participation compared to the 2021 results. Perhaps the most noteworthy thing was that collaborations in the field of exoplanets and occultations were increasing in participation. The Virtual Observatory continued to be fundamental in establishing and maintaining collaborations between professionals and amateurs, and the use of its tools and services increased compared to the previous survey.

Although 47% of professionals who responded to the 2023 survey said they were aware of the measures taken by the SEA's Proam Commission over the previous two years, only 26.5% of amateurs surveyed seemed to know them. This showed us that we have a problem communicating and disseminating information about our activity, especially among the amateur community.

On this occasion, a total of 1,450 works were compiled, including articles in scientific journals, contributions to conferences, electronic circulars, and catalogues. These were classified according to the main areas of collaboration: minor bodies, solar system, exoplanets, heliophysics, variable stars and supernovae, double stars, stellar physics, galaxies, spectroscopy and radio astronomy, high energies, light pollution, astronautics and scientific dissemination. The field of minor bodies stood out in particular, with 1,128 works, many of them in the form of electronic circulars that collect astrometric and photometric data on comets and asteroids routinely observed by amateur astronomers. In other areas, such as variable stars and supernovae (150 works) or double stars (40), there was also significant activity. Exoplanets and the solar system were represented mainly in the form of conference papers. It is significant that the number of articles in scientific journals (229) far exceeded that of conference contributions (66), highlighting the depth and scientific impact of many of these collaborations.

4 Final remarks

In order to maintain the motivation of participating amateurs, we propose increasing communication between the professionals and amateurs participating in each collaboration, involving amateurs in some internal meetings and informing them of the progress of the study carried out with their contributions. We also recommend that professional astronomers who organise scientific conferences plan a parallel meeting dedicated to Proam collaboration or an informative talk within the conference programme and invite amateurs to attend.

The SEA Proam Commission, in collaboration with the FAAE, will continue to organise both training courses and informative sessions on collaboration between professional and amateur astronomers in Spain, and we will continue to expand our website with information and resources for both communities. Similarly, we will continue to participate in the organisation of the CEA and Proam conferences, and to announce the Javier Gorosabel award.

Lastly, we would like to encourage all astronomers, professionals and amateurs, to participate in Proam collaborations and encourage those already involved in a Proam project, past or present, to disseminate their studies and results. We offer our services (website, monthly sessions...) to those who need a means of dissemination or want to publicise their project in Spain.