

Towards Gender Equity in Indian Astronomy

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Abstract. The Working Group for Gender Equity (WGGE) was formally constituted under the Astronomical Society of India (ASI) in 2015 to increase awareness about gender-related issues in the astrophysics community. The current WGGE comprises eight astrophysicists from different institutes and universities across India. The WGGE organizes the Anna Mani memorial lectures on gender sensitization, which include practitioners from other disciplines in the discourse. These lectures have included eminent speakers who are science historians, philosophers of science, science journalists, social scientists and natural scientists. The WGGE carries out gender audits of Indian research institutes and conducts regular surveys of ASI members and participants via questionnaires. Gender sensitization sessions by the WGGE, including open discussion and feedback from the ASI participants and the availability of subsidized childcare, are now integral to the annual ASI meetings. 33% of the invited speakers and session chairs at these meetings are now women.

GENESIS OF THE WGGE

Gender inequity in physics in general and in astrophysics is an ongoing problem. The lack of representation of women is often attributed to the myth that girls and women are intrinsically less suited to science, technology, engineering and mathematics, relative to boys and men. However, in India, despite girls pursuing national-level science competitions for fellowships and outperforming boys [1] anecdotal evidence abounds that they are discouraged from pursuing science due to gender stereotyping and unconscious bias. Additional barriers to women in physics arise from stereotypes of how science is done, with physics often being portrayed as a solitary endeavor.

The situation is changing. Professional societies worldwide, including the International Astronomical Union, the American Astronomical Society, and the Astronomical Society of Australia, now have formal commissions or working groups devoted to addressing gender inequity in astrophysics. In September 2015, the executive council of the Astronomical Society of India (ASI, which has over 1000 members) [2] approved the formation of a Working Group for Gender Equity (WGGE) [3].

The motivation behind setting up the WGGE was the underrepresentation of women astrophysicists in permanent faculty positions, despite substantial representation at the undergraduate and graduate levels. The lack of representation of women faculty was also evident from the gender statistics collected from all major astrophysics institutes in India. Women accounted for a mere 13% of professional astrophysicists, in contrast to ~30% of PhD students at various astrophysics institutes and universities. Therefore, to address issues related to gender equity within

the astrophysics community of India, the WGGE was constituted. It now comprises eight astrophysicists from different research institutes and university departments across India, with Preeti Kharb as the chair. The WGGE collects and analyzes data on gender diversity in the profession, conducts gender sensitization talks and workshops, maintains a webpage with relevant resource material, and provides essential mentorship to students and postdocs when needed.

The WGGE also supports efforts of the similar Gender in Physics Working Group (GIPWG) [4] of the Indian Physics Association (IPA) [5], founded in 2017 with Prajval Shastri as the chair.

In the next section, we describe some recent activities of the WGGE that contribute towards creating an equitable workplace environment for the members of the Indian astrophysics community.

WGGE ACTIVITIES AND THEIR IMPACT

The skewed gender ratio among astrophysics faculty is a symptom of bias in recruitment and career development [6, 7]. Visible representation of women scientists in the profession plays an essential role in shaping young peoples' ideas on who can do science and in showing girls what they can be. In addition, the lack of women's representation strengthens the myth that women have not made significant contributions to society.

Therefore, the WGGE formally instituted 2- to 3-hour plenary sessions to discuss gender inequity during the ASI annual meetings, and speakers have included scientists, social scientists, and philosophers. These sessions have been very well attended by participants of all genders, with significant engagement by attendees. One of the major outcomes has been the regularization of childcare at these conferences. Another rewarding outcome is that the ASI meetings' scientific organizing committee ensures gender diversity while choosing invited speakers and scientific session chairs, bringing the steadily increasing fraction of women speakers in the ASI annual meetings to 33% in 2021.

The WGGE members have presented talks on the group's activities in both national [8, 9] and international [1, 10, 11] conferences. The WGGE has been organizing a regular nationwide Anna Mani Gender Equity Lecture Series. Anna Mani, after whom this lecture series is named, was a pioneering Indian physicist and meteorologist who carried out path-breaking research in the 1950s in India against all odds. The lectures are delivered primarily by scholars and practitioners from disciplines outside astrophysics, viz., social scientists, science journalists, and philosophers. They included Sumi Krishna, social scientist and past president of the Indian Association for Women's Studies (2018); Amrita Banerjee, philosopher, IIT Mumbai (2019); Aashima Dogra and Nandita Jayaraj, science journalists of the Life of Science feminist journalist collective, Rohini Godbole, physicist, Indian Institute of Science, Meera Nanda, writer and historian of science, IISER Pune and Mohali, and Abha Sur, science historian, MIT, USA (all 2020); and Jayasree Subramanian, mathematics educationist at the SRM University, Vidita Vaidya, neuroscientist at the Tata Institute of Fundamental Research, Mumbai, and Gita Chadha, sociologist, University of Mumbai (all 2021). The recorded Anna Manni lectures are available as resource material on WGGE's webpage [12].

The WGGE has conducted gender audits of select major Indian astrophysics departments/ research institutes. The data collected for 2016, 2017, 2019, and 2020 confirm the "leaky pipeline" effect. However, the average proportion of women faculty increased marginally from 13% to 16% between 2016 and 2020 (Fig. 1).

The WGGE conducted its second anonymous survey of Indian astrophysicists in 2021, which is still being analyzed. Forty-five percent of the 97 respondents were women, who were dominated by younger scientists to a greater extent than the men respondents. More women respondents (~70%) were from the 30–50 age group than men respondents (~63%) in that age group. Further, the survey indicated the following:

- 22% women and no men reported having faced sexual harassment.
- 38% of both women and men reported knowing someone who faced sexual harassment.
- 83% percent of women and 43% of men perceived gender discrimination in academic institutions.
- The majority of the respondents reported the absence of workplace childcare.
- Most respondents felt that the gender gap is due to societal constraints on women.
- 91% women and 85% men felt childcare facilities in the workplace would reduce the gender gap.
- 80% women and 70% men felt that mentoring programs for young women would help reduce the gap.
- Most respondents felt that open discussions on gender discrimination are needed.

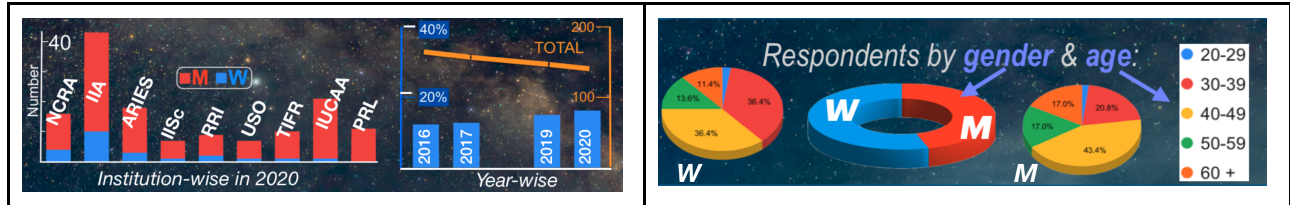


FIGURE 1. Left: The proportions of women (blue) and men (red) among the astrophysics faculty in a selected set of elite institutions in India as of 2020. Names of the institutions (acronyms in white) are National Centre for Radio Astrophysics, Indian Institute of Astrophysics, Aryabhata Research Institute of Observational Sciences, Indian Institute of Science, Raman Research Institute, Udaipur Solar Observatory, Tata Institute of Fundamental Research, Inter-University Centre for Astronomy & Astrophysics, Physical Research Laboratory. Clearly, the fraction of women is exceedingly low in all cases. The year-wise proportion of women among the astrophysics faculty (blue bars) and the total number of astrophysics faculty (yellow curve) in all these institutions together, from 2016 to 2020 except 2018, as no survey was conducted that year. The total number of astrophysics faculty in these institutions shows a slight decrease overall since 2016 due to retirements, but the proportion of women has increased slightly, providing grounds for optimism. Right: The demographics of the respondents to the WGGE survey of astrophysicists countrywide were gathered via a questionnaire. Forty-five percent of the respondents were women, who were dominated to a greater extent by the cohort under 50 years of age, compared with men.

PLANNED FUTURE WGGE ACTIVITIES

The WGGE-ASI has been able to have a substantial positive impact on how the ASI meetings are organized and run from the gender equity angle. The WGGE looks forward to significant transformation in the understanding of gender disparity within the profession, particularly aided by involving interdisciplinary practitioners in the discourse. The results from the recent survey conducted by the WGGE strongly suggest, however, that these efforts must be strengthened. Therefore, the WGGE plans to continue the Anna Mani Gender Equity Lecture Series. The WGGE also plans to regularly conduct nationwide surveys to enable evidence-based interventions towards gender equity.

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