

22nd International Conference on Atomic Processes in Plasmas and 1st NIFS Conference on Atomic and Molecular Processes in Plasmas: Preface

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This volume contains the Proceedings of the 22nd International Conference on Atomic Processes in Plasmas (APiP 2025) and the 1st NIFS Conference on Atomic and Molecular Processes in Plasmas, held jointly from 21 to 25 July 2025 in Tokyo, Japan, in cooperation with the International Atomic Energy Agency (IAEA).

Since its inception in 1977 as a topical conference of the American Physical Society, the APiP conference series has provided an important forum for the discussion of atomic and molecular processes in plasmas. Beginning with the 15th conference in 2007, APiP evolved into a fully international conference, and since the 16th conference in 2009 it has been held not only in the United States but also at venues outside the country. The 22nd APiP conference, APiP 2025, marks the first time that the conference has been held in the Asian region. Because research in this field in Japan has strong ties to fusion research centered at the National Institute for Fusion Science (NIFS), APiP 2025 was co-organized by NIFS and held jointly with the NIFS Conference on Atomic and Molecular Processes in Plasmas.

The present conference brought together 94 participants from 18 countries, including 19 students, reflecting the strong international and intergenerational character of the community. The scientific program consisted of 22 invited talks, 23 contributed oral presentations, and 47 poster presentations, highlighting both the breadth and depth of current research activities in atomic and molecular processes in plasmas.

A special feature of the present conference was a series of memorial talks dedicated to the late N. Badnell and H. Scott, who made long-standing and significant contributions to the APiP conference series as well as to the field of atomic processes in plasmas. These talks provided an opportunity to honor their scientific achievements and to acknowledge their

lasting impact on the community.

The program also featured a special lecture by Yu. Ralchenko, leader of the NIST Atomic Spectroscopy Group, who presented an overview of the group's activities after a period of serious uncertainty about its future that had persisted until shortly before the conference. This lecture emphasized the continuing importance of sustained efforts in atomic spectroscopy for plasma science and related applications.

Among the poster presentations, 14 were given by students. Three posters were selected as Best Student Posters based on votes cast by the regular participants of the conference. The awards were presented to Leo Hirata, Kazuyoshi Yamada, and Geethika B. R. during the conference banquet.

I would like to express my sincere gratitude to all invited speakers, contributors, session chairs, and participants for their valuable contributions, as well as to the organizing committee and supporting staff for their dedicated efforts in making the present conference a successful and stimulating conference. It is our hope that these Proceedings will serve as a useful record of the present conference and as a lasting resource for researchers in plasma physics, atomic physics, and related fields.

Finally, the present conference was supported by the Kajima Foundation and the Society for Promotion of Space Science. The organizers would like to express their sincere gratitude for this support.

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This is the preface for the special issue as the proceedings of the Joint Conference of the 22nd International Conference on Atomic Processes in Plasmas (APiP 2025) and 1st NIFS Conference on Atomic and Molecular Processes in Plasmas.



Group photo of the participants of the 22nd International Conference on Atomic Processes in Plasmas and the 1st NIFS Conference on Atomic and Molecular Processes in Plasmas, held on July 21-25, 2025, at the International Center, Tokyo Metropolitan University.

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