

Commission B5 Laboratory Astrophysics - Activity report 2022

The purpose of the Laboratory Astrophysics Commission (B5) is to address the multidisciplinary needs and requirements of modern astronomy and planetary science. As a result, the Commission encompasses the four fundamental research areas that generate astrophysical data needs: atomic and molecular astrophysics, physics and chemistry of solid materials and condensed matter (dust and ices), plasma astrophysics, and nuclear and particle astrophysics. The Commission embraces interdisciplinary studies crossing physical, chemical, biological, geological sciences of relevance to astronomy, including experiment, theory, and modeling, from the nuclear and atomic/molecular level to application on astronomical scales.

In summary, the Laboratory Astrophysics Commission is a strongly cross-disciplinary commission with the aim to assist all IAU members in providing the data needed to interpret and understand astronomical observations and to promote Laboratory Astrophysics.

The commission had two working groups during 2022, “Spectroscopic and Radiative Data for Molecules”, and an Inter-Commission B2-B5 working group on “Laboratory Astrophysics Data Compilation, Validation and Standardisation: from the Laboratory to FAIR Usage in the Astronomical Community”.

The commission held two sessions at the general assembly in August 2022; one a general business meeting for the commission, including presentations of national and regional activities in laboratory astrophysics, and the other based around the activities of the working group on “Laboratory Astrophysics Data Compilation, Validation and Standardisation”. The agendas are given below (from a snapshot of the updated News page at https://www.iau.org/science/scientific_bodies/commissions/B5/info/news/) and presentations have been uploaded to a Zenodo community: <https://zenodo.org/communities/cb5-labastro/>

Laboratory Astrophysics commission meeting.

Chair: P. Barklem & M-L. Dubernet Room 101

- 10.30 – 10.40 CB5 – Laboratory Astrophysics – present and future (Paul Barklem, Marie-Lise Dubernet) [10.5281/zenodo.7002737](https://zenodo.org/record/7002737)
- 10.40 – 10.50 Laboratory Astrophysics in Korea (Dongsu Ryu) [10.5281/zenodo.7002820](https://zenodo.org/record/7002820)
- 10.52 – 11.02 Laboratory Astrophysics in South America/Brazil (Beatriz Barbuy) [10.5281/zenodo.7002776](https://zenodo.org/record/7002776)
- 11.04 – 11.14 Quantum Sensing for Astronomy (Peng Kian Tan). [10.5281/zenodo.7002788](https://zenodo.org/record/7002788)
- 11.16 – 11.26 Activities of laboratory astrophysics in Japan (Naoki Watanabe) [10.5281/zenodo.7002770](https://zenodo.org/record/7002770)
- 11.28 – 11.38 Laboratory Astrophysics in the US (Farid Salama) [10.5281/zenodo.7002764](https://zenodo.org/record/7002764)
- 11.40 - 11.50 Laboratory Astrophysics in Europe (Paul Barklem, Marie-Lise Dubernet) [10.5281/zenodo.7002754](https://zenodo.org/record/7002754)
- 11.52 - 12.00 Conclusion and discussion (Paul Barklem)

Laboratory Astrophysics Databases: from the provider to the user: encouraging FAIRness.

Chair: ML Dubernet and B. Berriman Room 101

- 13.30 – 13.40 WG Activities and Plans (ML Dubernet) [10.5281/zenodo.6979299](https://zenodo.org/record/6979299)
- 13.40 – 13.45 FAIR principles in VAMDC (ML Dubernet) [10.5281/zenodo.6979299](https://zenodo.org/record/6979299)
- 13.45 – 13.55 FAIR principles in IVOA (B. Berriman) [10.5281/zenodo.7049804](https://zenodo.org/record/7049804)
- 13.55 – 14.10 The NASA Ames PAH IR Spectroscopic Database (Christiaan Boersma) [10.5281/zenodo.7042959](https://zenodo.org/record/7042959)
- 14.10 – 14.25 Laboratory Astrophysics Databases on Grains and Ices: From the Laboratory to the Users (Cornelia Jäger) [10.5281/zenodo.7040441](https://zenodo.org/record/7040441)
- 14.25 – 14.40 About the atomic and molecular databases in the planetary community (Miriam Rengel) [10.5281/zenodo.7040446](https://zenodo.org/record/7040446)

14.40 – 14.55 Examples of astro analysis tools: ENIGMA (Will Rocha) [10.5281/zenodo.7040458](https://zenodo.org/record/7040458)
14.55 – 15.00 General Discussion and concluding remarks

In addition, for future reference, past annual and triennial reports have also been collected at the Zenodo community.

The commission was further involved in the preparation of “IAUS 371: Honoring Charlotte Moore Sitterly: Astronomical spectroscopy in the 21st century” held as a focus meeting at the general assembly.