



**06.01.2022 – 10:00 h**

At Zoom virtual meeting: <https://desy.zoom.us/j/83631120632>

Meeting ID: 836 3112 0632 Password: 235618

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**Lucie Kolesniková**

**"From Laboratory to Space: Generation and Spectroscopic Characterization of Molecules of Astrophysical Interest"**

Interstellar space hosts complex chemical reactions that proceed in multiple steps with a correspondingly large number of intermediate compounds. The compounds may include molecular ions, radicals, carbenes, metastable isomers, and other transient species. [1,2] The remote spectroscopic detection of these short-lived species is often the only way to disentangle the chemistry of the environments where they reside and to explain the reaction mechanisms involved. This spectroscopic diagnostic primarily relies on laboratory experiments, which provide reference data to interpret those from remote observations. Creating the short-lived species in laboratories by contemporary chemistry is arduous, if not impossible, and their nature precludes storage. Dedicated laboratory experiments are therefore needed to enable in situ generations. In the present contribution, different methods of the preparation of potential interstellar molecules in laboratories will be presented in combination with microwave and millimeter wave spectroscopic studies to fulfill the first requirement for an unequivocal identification of these molecules in space, i.e., the availability of transition frequencies with high accuracy. Special emphasis will be placed on laser ablation of solid organic precursors as an innovative avenue toward the generation of unsuspected molecular species of astrophysical interest. [3]

**References**

[1] E. Herbst, E. F. van Dishoeck, *Ann. Rev. Astron. Astrophys.* 2009, 47, 427.

[2] B. A. McGuire, *Astrophys. J. Suppl. Ser.* 2018, 239, 17.

[3] L. Kolesniková, I. León, E. R. Alonso, S. Mata, J. L. Alonso, *Angew. Chem. Int. Ed.* 2021, 60, 24461

**Host: Melanie Schnell / CFEL Molecular and Ultrafast Science Seminar**