



**8<sup>th</sup> August 2025 - 10:00 h**

**Building 99, 1<sup>st</sup> floor, SR V**

---

**Marius Gerlach**

*HFML-FELIX, 6525ED Nijmegen, The Netherlands*

**X-ray, VUV, and Infrared spectroscopy of small  
astrochemical molecules**

HNCO, isocyanic acid, HCNO, fulminic acid, and HNCS, isothiocyanic acid, are the smallest molecule that contain the essential atoms for organic life and have also been detected in a number of different astronomical objects.[1-3] HNCO in particular is ubiquitous in space[4] and may also be linked to the potentially prebiotic molecule formamide.[5] I have investigated the spectroscopy of these molecules and related ions using synchrotron and FEL light sources in the X-ray, VUV and IR range to gain a deeper insight in their potential destruction and formation mechanisms in space. In my talk, I will give an overview over these findings and present in more detail the dissociative photoionization of HCNO as well as the leak-out spectroscopy of H<sub>2</sub>NCO<sup>+</sup> and H<sub>2</sub>NCS<sup>+</sup>.

References

- [1] L. E. Snyder, D. Buhl, *Astrophys. J.* 1972, 177, 619.
- [2] M. A. Frerking, R. A. Linke, P. Thaddeus, *Astrophys. J.* 1979, 234, L143-L145.
- [3] N. Marcelino, J. Cernicharo, B. Tercero, E. Roueff, *Astrophys. J.* 2009, 690, L27-L30.
- [4] I. Zinchenko, C. Henkel, R. Q. Mao, *Astron. Astrophys.* 2000, 361, 1079-1094.
- [5] A. López-Sepulcre, N. Balucani, C. Ceccarelli, C. Codella, F. Dulieu, P. Theulé, *ACS Earth Space Chem.* 2019, 3, 2122-2137.

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