Contribution ID: **65** Type: **Oral Presentation**

An astrochemical perspective on Radioactive Molecules

Astrophysical observations of radioactive isotopes, like 26Al, 44Ti, or 60Fe, provide insight into the nucleosynthesis of stellar cores [1]. Recently, the radioactive molecule 26AlF was unambiguously astronomically identified towards the object CK Vul [2] by rotational transitions in the microwave spectral region, using the radio telescope observatory ALMA and other telescope facilities. In addition, the vibrational modes of radioactive molecules can be used to identify them in hot stellar environments with infrared instruments such as EXES/SOFIA or the James Webb telescope.

While accurate rotational and vibrational spectra of diatomic molecules can be derived from laboratory measurements of their stable isotopologues, this isotopic scaling method fails for triatomic species such as 26AlOH and forall larger species and thus, requiring in situ spectroscopic measurements on radioactive molecules. Facilities such as ISOLDE/CERN [3] and TRIUMF in Canada are perfectly suited for producing radioactive molecules in supersonic beams. Spectroscopic studies of radioactive species at ISOLDE or TRIUMF will enable future astronomical observations that will provide more detailed information about the processes in the interiors of massive stars. In this talk, astrophysically relevant molecules for studies using rotational and vibrational spectroscopy will be discussed.

---

[1] Tur *et al.*, ApJ **718**, 357 (2010)
[2] Kaminski *et al.*, Nat. Ast. **2**, 778 (2018)
[3] Garcia Ruiz *et al.*, Nature **581**, 396 (2020)

Length of presentation requested

Oral presentation: 17 min + 3 min questions

Please select between one and three keywords related to your abstract

Meteoritic Materials and Stardust

2nd keyword (optional)

Chemical Evolution

3rd keyword (optional)

Interstellar Medium

Primary author: BREIER, Alexander A. (University of Kassel (DE))

Co-author: GIESEN, Thomas F. (University of Kassel (DE))

Presenter: BREIER, Alexander A. (University of Kassel (DE))