

STARDUST (Creation, Heating, Acceleration and Measurement of Nanoparticles)

Objectives

Simulate in the laboratory the astrochemical process of a red giant star. Stardust create interstellar dust from nanoparticle formation with different magnetrons targets. We can choose neutral nanoparticles and ions that heating and accelerating in vacuum. The interaction with dust created and different gases it is possible measured with multiple spectroscopic techniques (XPS, AES, UPS, TPD, LEIS), and external measurements as AFM, TEM, SEM and STM.

Environmental conditions

- Create nanoparticle from 3 targets with different materials (C, Fe, Au, etc..), and different gases (He, Ar).
- Interactions in the nucleation's step with different reactive gases (C₂H₂, HCN, O₂, etc,..)
- Initial pressure of 1mbar up to 10⁻¹⁰mbar.
- Gas ice formation and study the interaction in fly and on a surface.
- Fabrication and recollection of nanoparticles «a la carte».

Chamber composition

- **MICS** (Multiple Ion Cluster Source). Source of ions and nanoparticles.
- **DIAGNOSIS** (Ion separation and formation). Neutral and ions selections and checking the size and rating of nanoparticles.
- **OVEN** (Heating Nanoparticles). Heating ions and nanoparticles with infrared radiation.
- **NEON** (Neutral Ions). Ions accelerations.
- **SPECS** (Infrared spectroscopy and ice formation). Study of ices of different gases with different dust interactions. **FTIR, RAMAN, and TDS**.
- **ANA** (Analysis chamber). Surface analysis in UHV (<10⁻¹⁰mbar), with different techniques; **XPS, UPS, TDS, AES, LEIS**.

