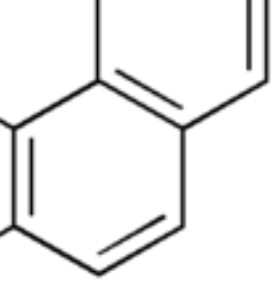
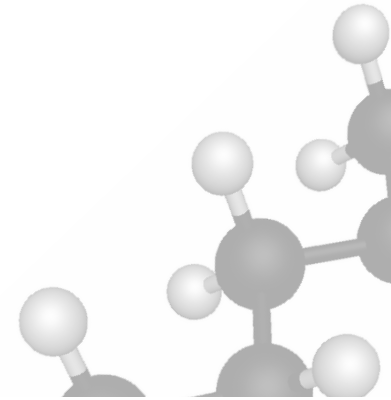


Journée du Laboratoire IRAP
21 Juin 2017

Rémi Bérard
1st year

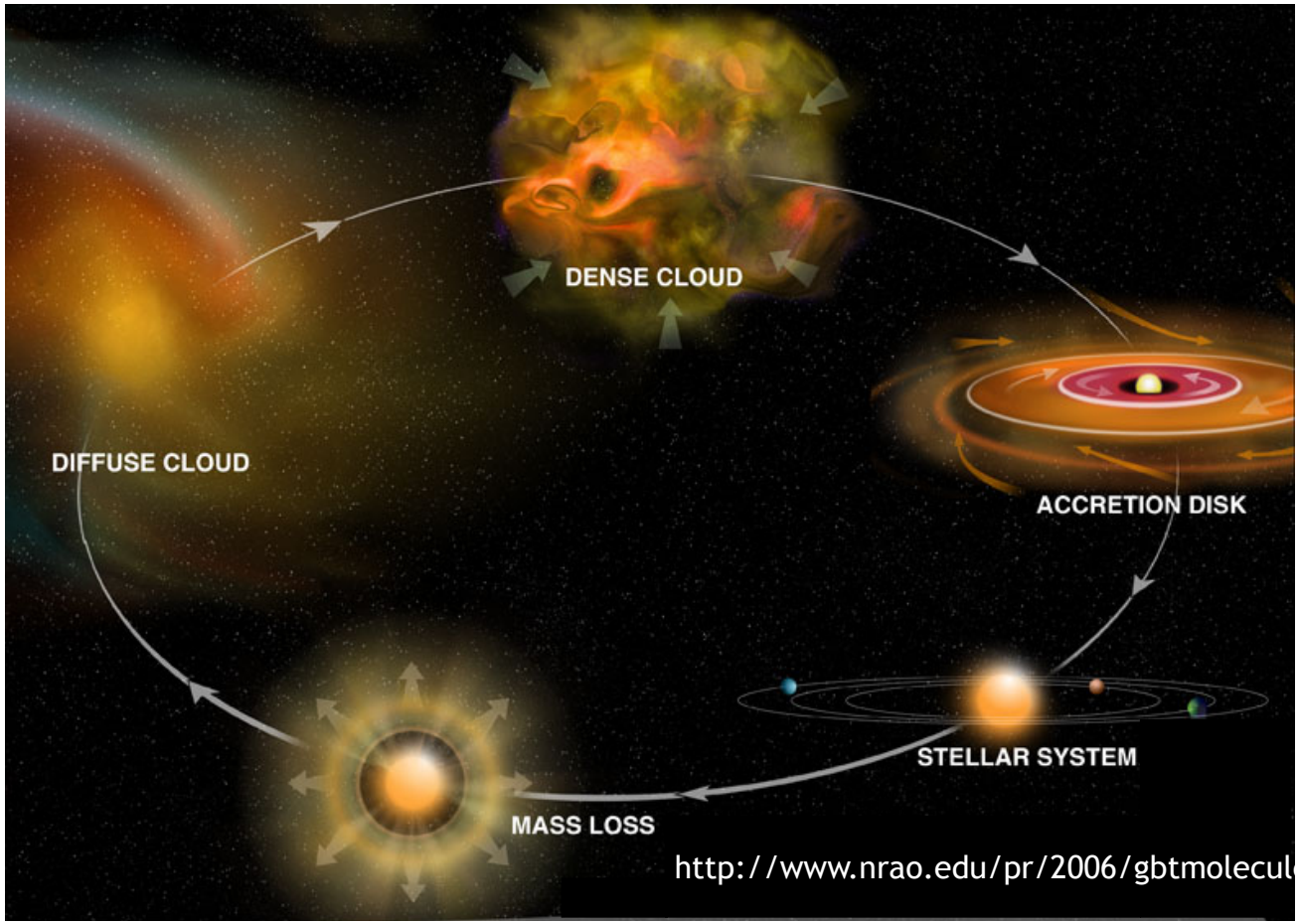
Formation and growing of laboratory analogues of cosmic dust : function of metals and C/O ratio exploration

Supervisors : Christine Joblin, Kremena Makasheva

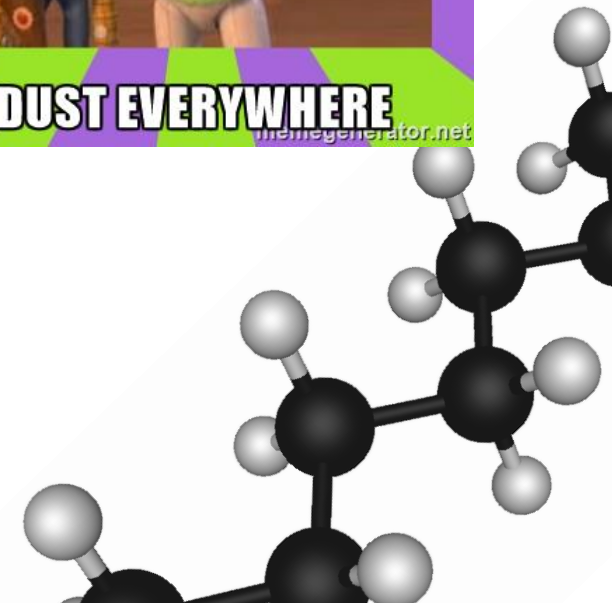


The gigantic universe

The nanometric universe



http://www.nrao.edu/pr/2006/gbtmolecul

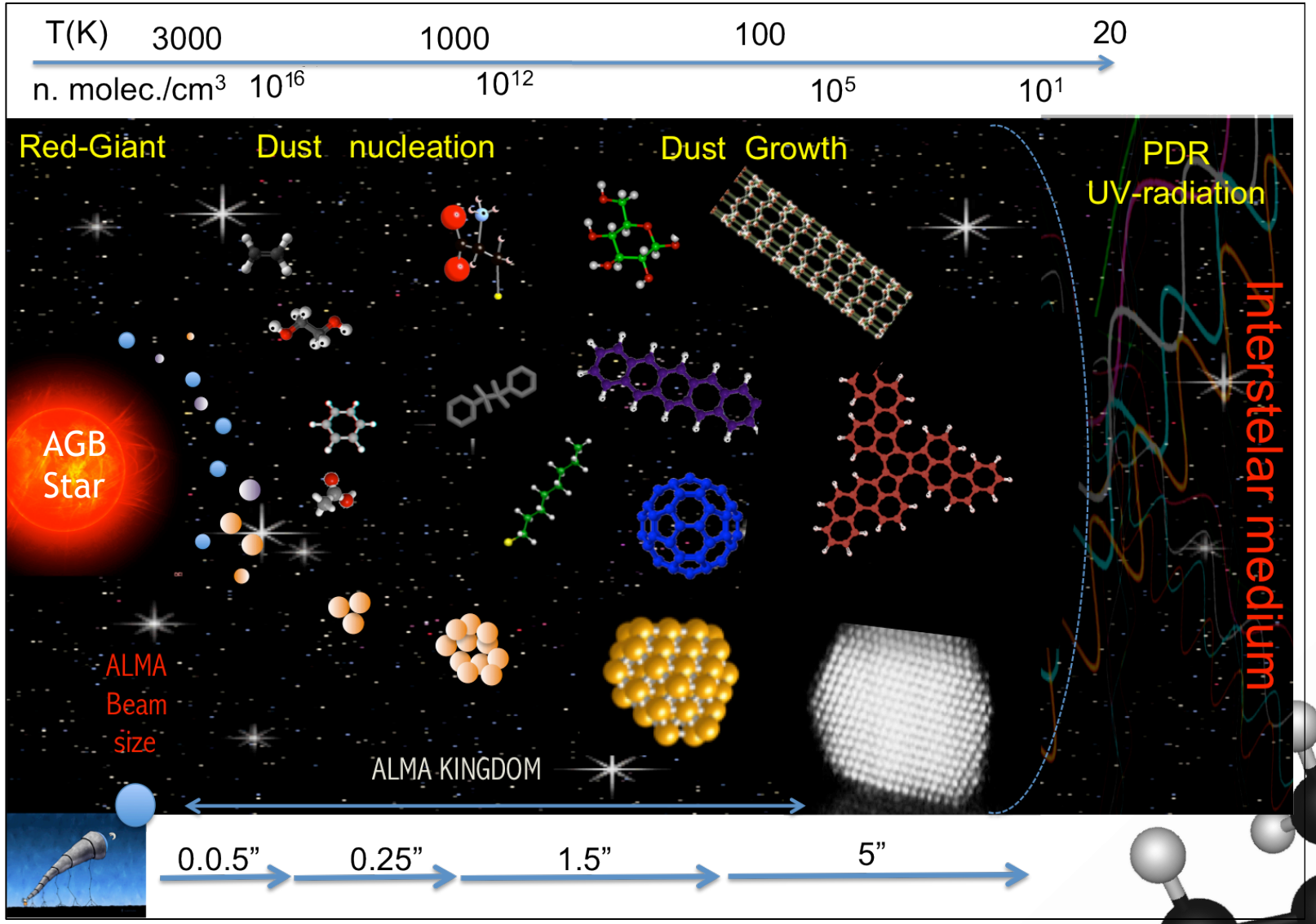


Dust formation in evolved stars

Two reaction paths:

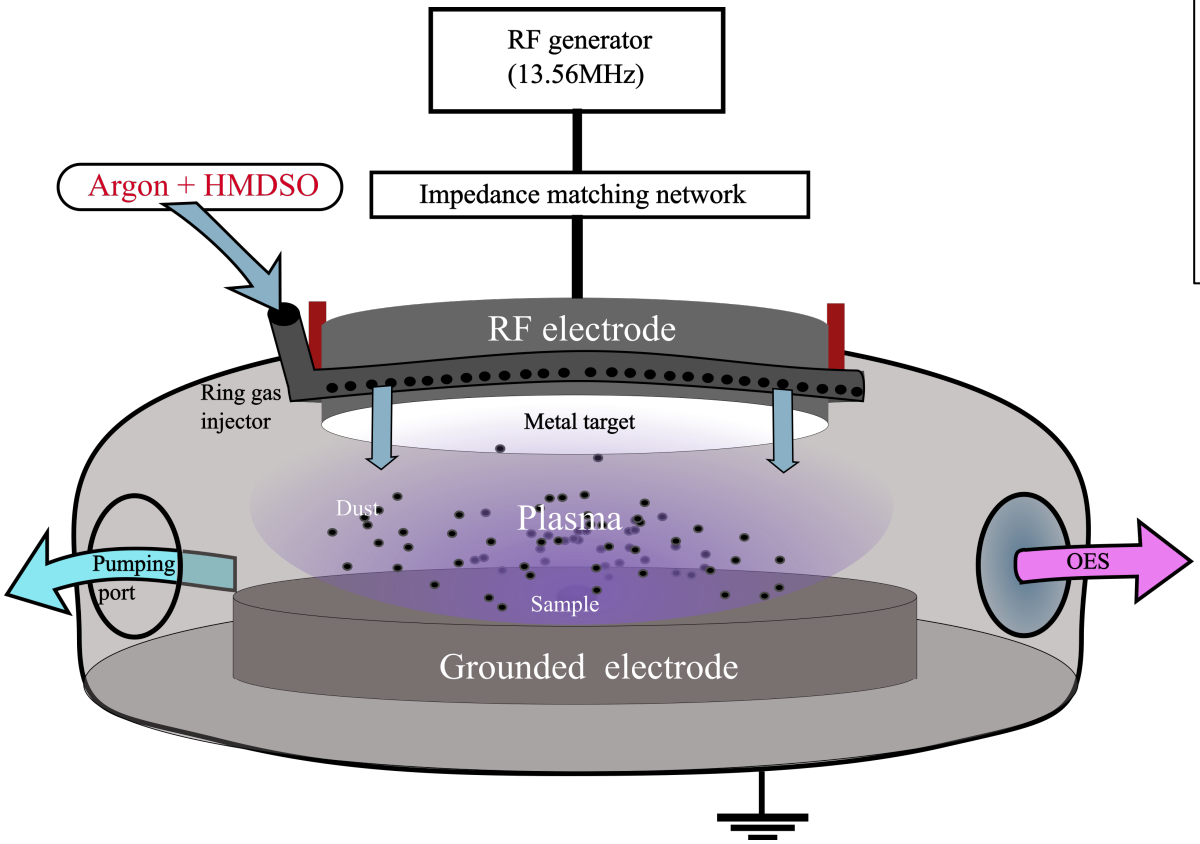
Carbonaceous (Polycyclic Aromatic Hydrocarbons and very small grains C/Si/Fe)
1-20 nm

Oxides/ silicates (mainly amorphous):
20-250 nm



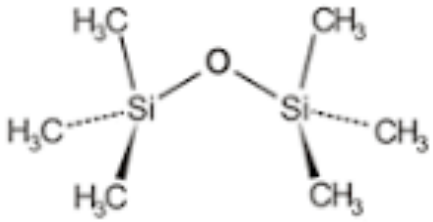
Simplified scheme combining C-rich and O-rich chemistries of dust formation in an evolved star (AGB)

Plasma synthesis

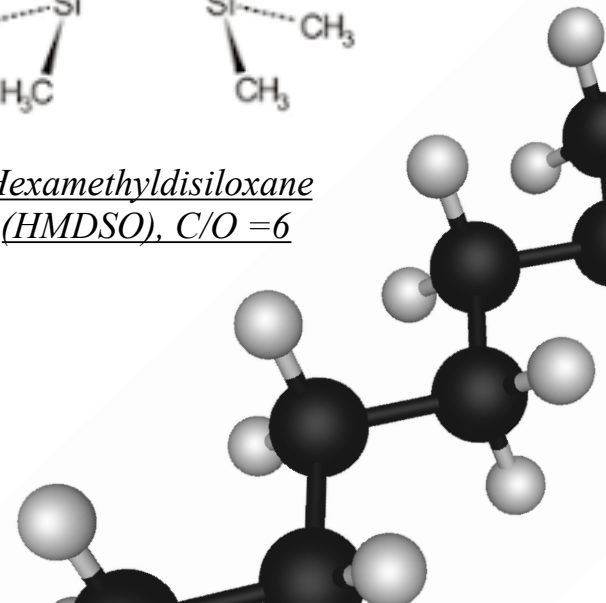


General characteristics:

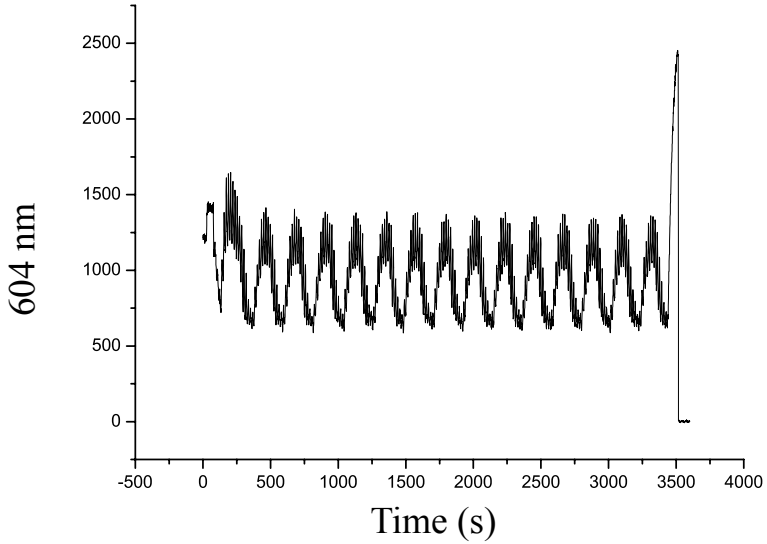
- Axially-asymmetric capacitively-coupled RF discharge (13.56 MHz)
- Pressure argon: 40mTorr
- Power: 10 – 60 W
- Pulsed injection of HMDSO
- O_2 influence
- Metal target: Silver (standard) or Iron (astro project)



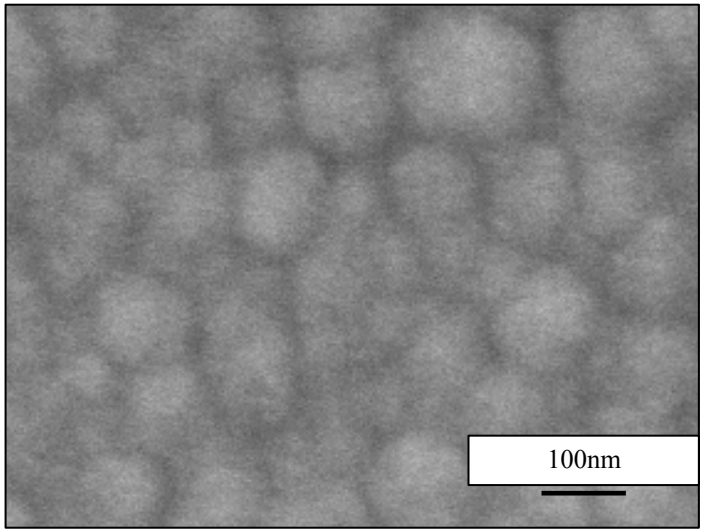
Hexamethyldisiloxane (HMDSO), C/O =6



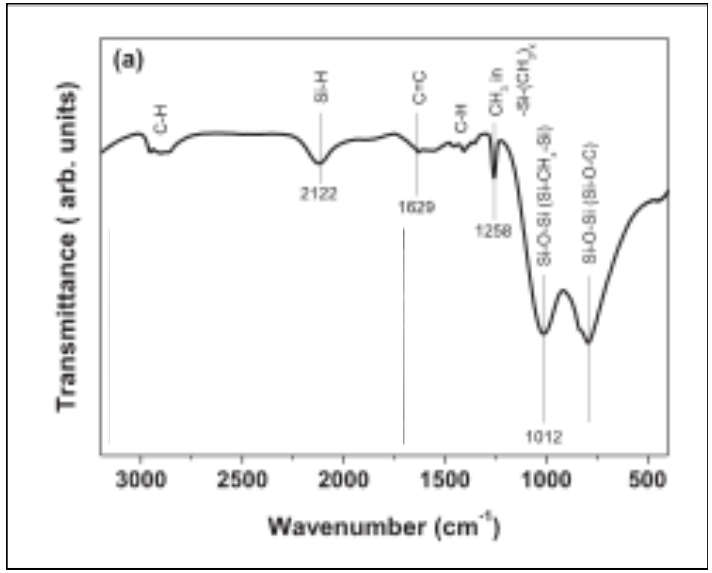
Characterization techniques



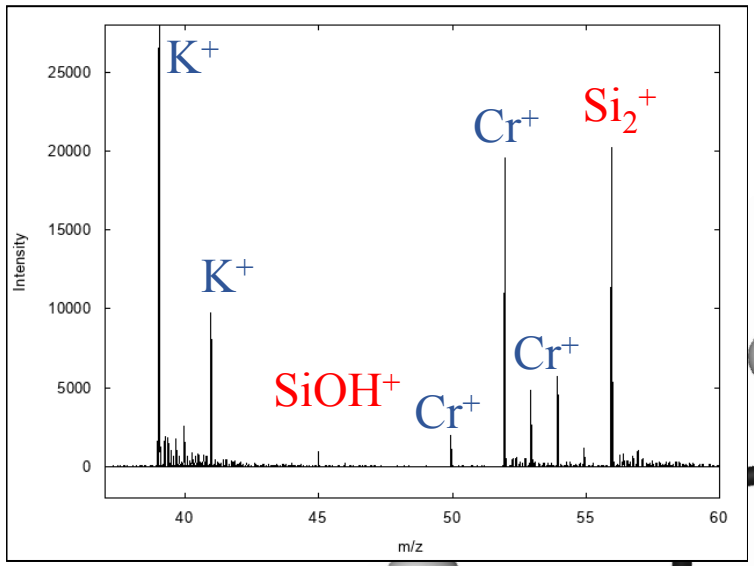
Optical emission spectroscopy



Scanning electron microscopy

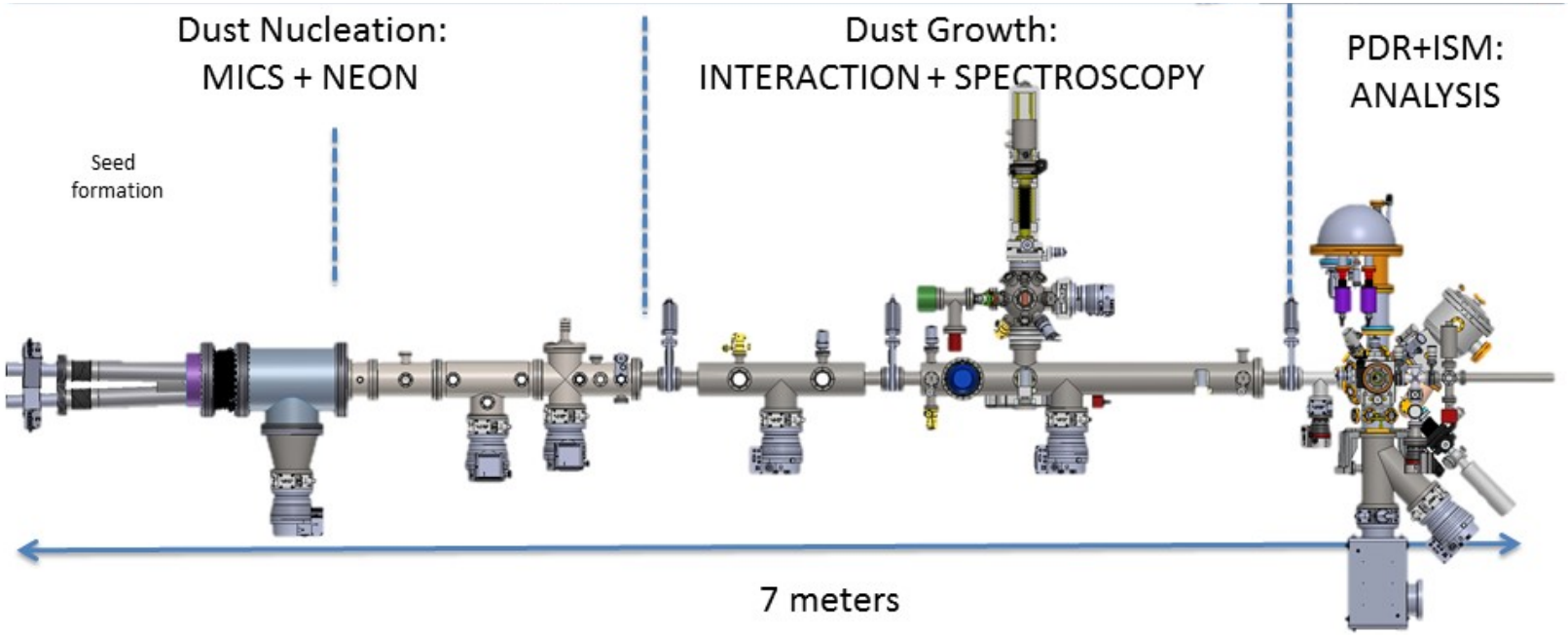


Infrared spectroscopy

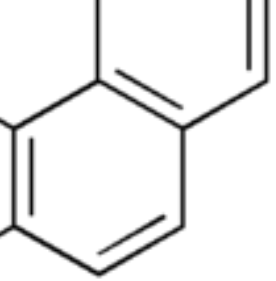


Mass spectroscopy

The stardust machine



nanoCOSMOS



Thank you for you attention