



Andromede delivers atomic beams from proton to gold, the rare gases He, Ne, Ar, Kr, Xe are available, molecular beams from the simplest CO, CH to C<sub>60</sub> and metal clusters from dimer to nanoparticles of 1000 atoms are also accelerated.

These beams are accelerated up to 4 MV the energy varies depending on the charge of the ions. For the molecular ions the charge is mainly 1, up to 3 for the C<sub>60</sub>. For cluster ions, these are

mostly mono-charged ions. Nanoparticles have 1 charge per 100 atoms.

Atomic ions can be multi-charged 4+ for example for Carbon up to 8+ for Argon.

An analysis magnet allows selection in mass/charge and energy. There are two beam lines available currently, a third can be opened. They correspond to the deflection angle of 90°, 70° (not available) for light atomic and molecular ions and 1°29 for cluster ions and nanoparticles.

On the 90° line can be installed different experiments as well as on the line at 70°. Today an experimental nuclear physics set-up is installed: Stella from the IPHC.

On the line at 1°29 there is a mass spectrometer with an electron and proton emission microscope which permits to obtain sub-micrometric ion imaging.

This line is used for particle-surface interaction studies, solid modification, and ionic imaging surface analysis.

Two irradiation devices can be installed for HRTEM microscopy analyzes; one device is cooled with liquid nitrogen.

Large diameter EDEN reaction chamber with rotating bottom and cryogenic pumping is also available for irradiations, RBS measurements and surface analysis by reflection and transmission. The angle of irradiation and analysis can be adjusted from 0° to 70°.

## R&D SOURCES

Two source test benches are also in operation near Andromede for low energy in the keV range up to 30 keV.

The TANCREDE device equipped with a MicroGan ECR source from Pantechnik.

The NAPIS ion column equipped with an LMIS source from OrsayPhysics.

These two test benches deliver beams which are analyzed in mass/charge and focused for irradiations, solid modifications or surface analysis (and for training).