Surface Science Instrument (“Cold machine”)

The instrument consists of an analysis chamber (AK), a preparation chamber (PK) and a two stage sample introduction system (two small chambers, one pumped by a turbo pump (2nd stage) and one by a primary pump (first stage)). The sample is mounted on a sample rod for measurement and transfer. The sample is mounted at the outside, brought to the first stage (1 mbar) than after several minutes to the second stage (10-7 mbar). After 30 minutes it is introduced to the preparation chamber. During the study, it is moved between preparation and analysis chamber.

**Preparation chamber:**

* Thin film deposition by sputter deposition (triode system, Ar pressure around 5 10-3mbar). Deposition can be done in presence of reactive gases to produce oxides (O2, gas), nitrides (N2 gas), hydrides (H2 gas)
* Thin film cleaning by sputtering (broad beam ion gun)
* - Atomic oxygen exposure (O is produced by splitting O2 in an ECR plasma source)
* Water deposition (through a capillary directed to the surface). Water is contained in a tank and degassed prior to the experiments.

**Analysis chamber**

* Photoelectron Analyser (Leybold, EA10, single channel)
* X-ray source (non monochromated, 12 kV, 30 mA): AlK, and MgK radiation
* UV-source (SPECS) – windowless source producing HeI, HeII and HeII\* radiation
* RGA

**Sample Analysis and Transfer rod**

* The sample is fixed by four screws on an isolated (thermally and electrically) sample holder.
* The holder is cooled by LN2 (flowing through a small reservoir directly beneath the sample). Because of the tight fixing by screws, thermal contact with the sample is excellent. -200°C are easily and rapidly reached.
* The sample can be heated to 800°C by an resistive heater integrated into the sample holder.
* Cooling and counter heating can be done simultaneously. All temperatures between -200°C and 800°C can be reached.