

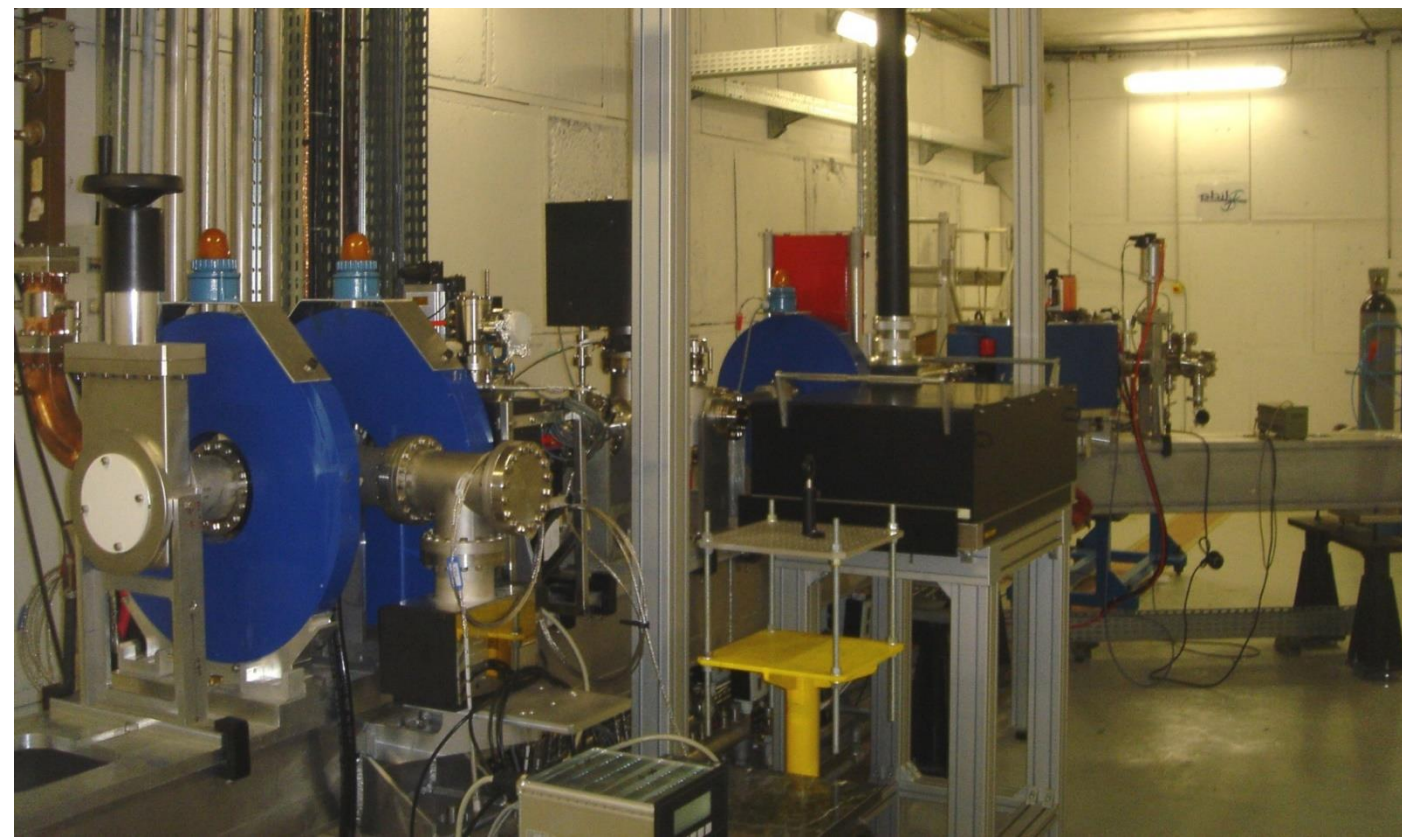
The National Centre for Scientific Research (CNRS) is a government-funded research organisation, under the administrative authority of French Ministry of High Education and Research. As the largest fundamental research organisation in Europe, CNRS carries out research in all fields of knowledge thanks to its organization in institutes.

The National Institute of Nuclear and Particle Physics (IN2P3) is one of the seven CNRS Institutes. One of its several scientific missions is the organization of the accelerator R&D activity in the belonging laboratories. The two CNRS/IN2P3 laboratories involved in the AMICI project are the Orsay Nuclear Physics Institute (IPNO) and the Linear Accelerator Laboratory (LAL). The two laboratories are located at Orsay and have a strong activity on accelerator science and technology. In the following a presentation the technological infrastructures dedicated to accelerator development in these two labs, that could be made available for the AMICI project partners, together with well-trained technical group.

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Test beam facilities

PHIL (LAL): Photoinjector test facility & ultra-short e- bunch source (150 fs/100 pC)



Beam characteristics today:

- 10 pC < Q < 200 pC (Cu) / Q ~ 1.4 nC (Mg)
- 1.5 MeV < E < 5 MeV (to be upgraded to 10 MeV)
- F = 5 Hz
- dE/E = 0.2% for 100pC 3 MeV
- Emittance 5 to 10 mm.mrad
- Pulse duration: 1 to 10ps (depending on the laser)

Surface Characterization laboratories



@ IPNO:

- Left in the ground: Mini SIMS for surface and in depth analysis of the element composition.
- In the right: Confocal microscope for surface imaging, roughness determination and 3D cartography.



@ LAL:

- X-ray diffractometer: cristallography and mechanical stress determination.
- X-ray reflectivity: nano film thickness determination, electronic density determination, roughness estimation.

Clean rooms for cavities and couplers preparation

Supratech ISO4 cleanroom (IPNO): Cleaning and preparing the superconducting cavities in an environment of high cleanliness.



- Total surface : 85 m² and 45 m² of class 10 (ISO 4)
- Ultra-pure water (18.2 MW-cm) production around 100 L/h
- DI Water tank : 1500L (about 4h HPR autonomy)
- High Pressure Rinsing system at 100 Bar (400L/h).
- Ambient temperature and humidity control
- Filtered N₂ and He gases (for leak tests and particle coating)
- Versatile handling carts for any geometries (elliptical, Spoke, QWR)
- Particle counter (from 25 µm down to 0.3 µm)

Coupler cleanrooms (LAL): Cleaning, assembly, preparation and RF conditioning of power couplers.



20 m² ISO6 clean room: coupler parts are degreased in ultra-sonic bath. The coupler warm parts are also assembled in this area.



8 m² ISO4 clean room dedicated to cold coupler part assembly.



70 m² ISO5 clean room: Preparation steps and the RF conditioning of couplers, equipped with:

- 3 ovens for in-situ backing cycles (up to 200° C), totally automatized, hosting up to 12 couplers.
- 2 leak test station and a large area for coupler assembly-disassembly.

Chemistry laboratory

Cavity etching laboratory (IPNO)



- Mixture of phosphoric, nitric And Hydrofluoric acids (2.4:1:1)
- Average etching rate : ~0.5 µm/minute
- Typical etching depth: between 10 and 250 µm

Available surface observation devices:

- Ultrasonic probe (local depth measurement)
- Roughness meter
- Optical microscope (× 1000) Bright Field, Dark Field, Polarized light



Experimental halls

@ IPNO: 2 experimental halls dedicated to cavities and cryomodules testing at various temperatures and RF powers, materials at cryogenic temperatures and host a thermometer calibration station.



- caves for testing, equipped with cryogenic connections and RF power : 10W@2K, 20W@2K, 40W@2K , 80W@2K
- vertical cryostats : Ø800, 2,5 m active height in bath or in vacuum configurations, active & passive magnetic shielding,
- vertical cryostats in helium bath configuration : Ø350 - 1,4 m active height, Ø270 - 1 m active height, Ø100 - 0,5 m active height.
- calibration station for cryogenic sensors operating between 300 K and 1.6 K .

@ LAL: an experimental hall dedicated to power coupler RF processing at room temperature.



- Source de puissance RF 1,3 GHz/5MW/4Hz:
 - Modulateur TBM (tension ajustable 2 à 8.5kV)
 - Klystron TH20277 A
 - Circulateur, diviseurs, guides d'onde
- 4 RF test benches with all the diagnostics allowing the conditioning of 8 couplers in the same time, automatically monitored by a Labview software.