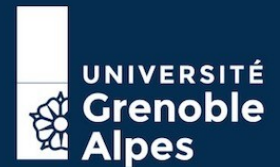


Laboratory of Subatomic Physics & Cosmology



LPSC : scientific and academic context



LPSC : presentation

Funding Agencies

Mixed Unit of Research from CNRS, University Grenoble Alpes and Grenoble-INP

CNRS : National Institute For Nuclear and Particle Physics (IN2P3)

Grenoble-Alpes University (UGA)

Engineering School Grenoble-INP (G-INP)

Organization

Research Activities

68 Permanent staff physicists (39 CNRS researchers, 29 university staff)

30 Phd Students and about 10 post-docs

→ Regrouped in **14 research teams**, each team being involved in 1 to 3 projects

Technical support Activities

87 permanent staff Engineers, Technicians and Administrative in 5 technical Departments

→ Common support services dedicated to ALL research activities in project

Technical Departments

Mechanics – Electronics – Computing - Instrumentation - Accelerator & Ion sources

Technological Platforms & facilities

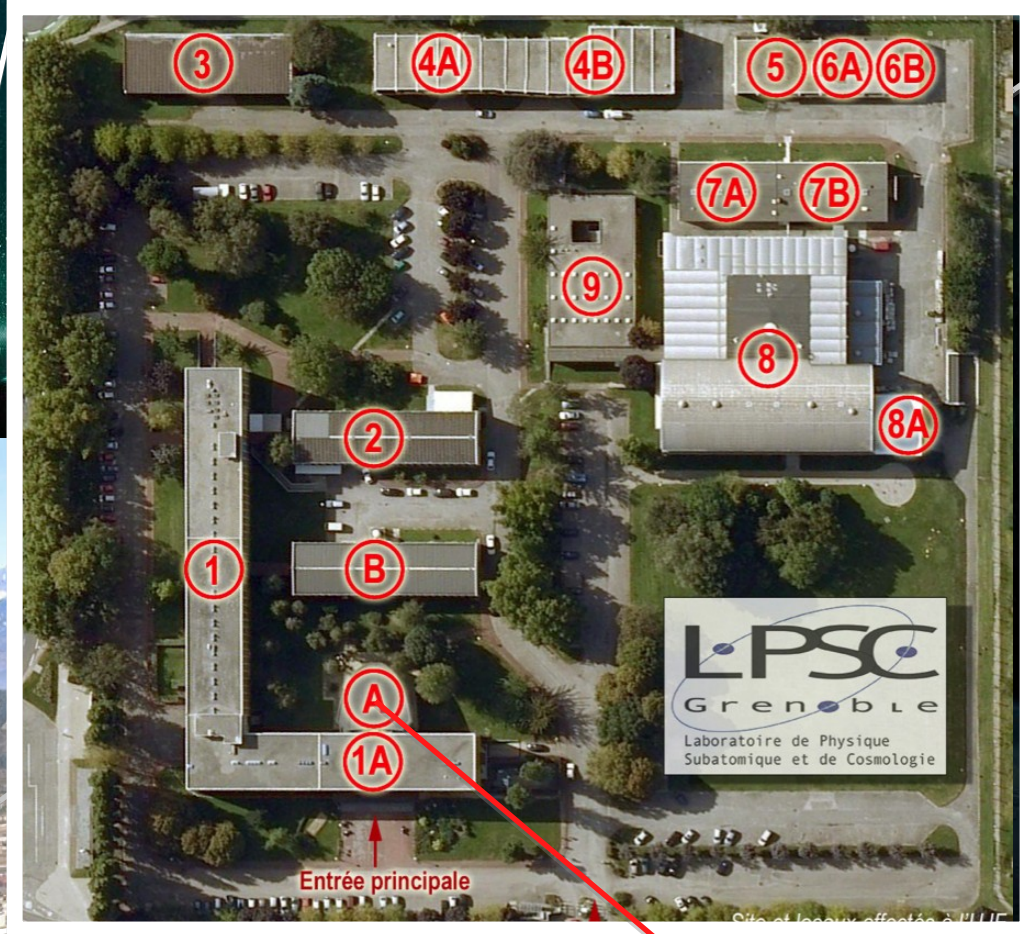
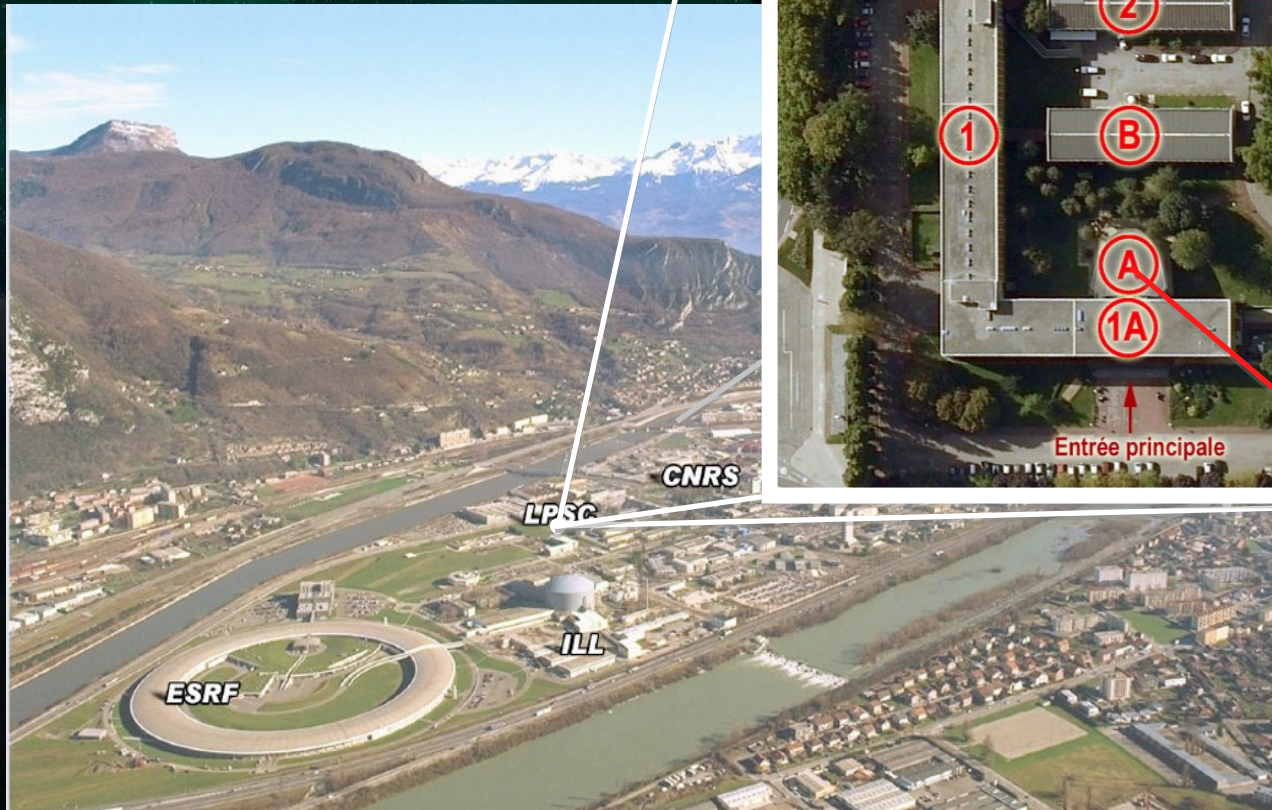
GENESIS – Neutron Source for rapid neutrons (nuclear data, irradiation for industrials)

FEST – Fluids Experiments and Simulations in Temperature (reactor physics activities)

PLASMA – Platform of micro-wave plasma reactor (materials, procedees)

Computing Grid – Tier2 (initially) for LHC and (now) beyond experiments

LPSC : facilities and infrastructures



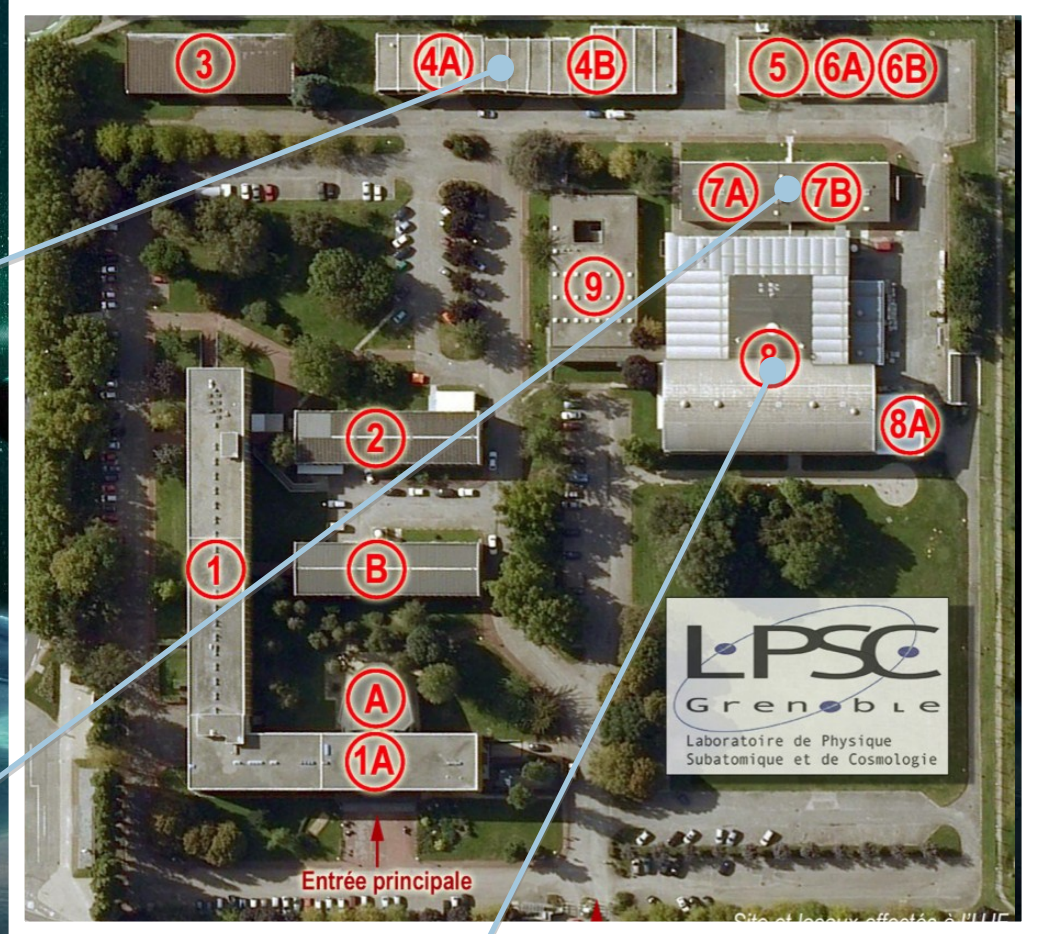
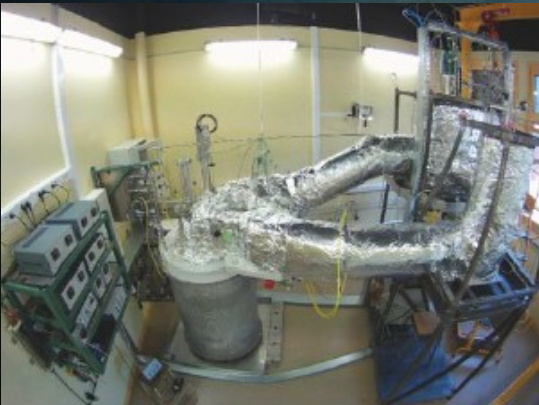
You are here ...

LPSC : facilities and infrastructures

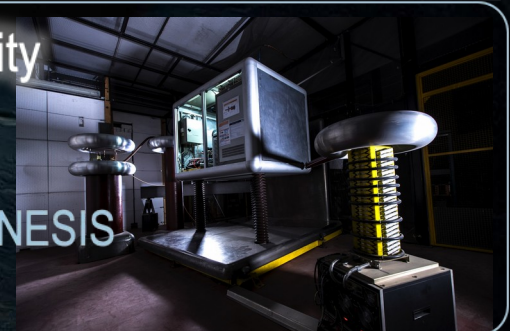
Plasma Reactor Facility
Research team
Plasma Reactor Hall



Chemistry Experimental Hall
Forced Fluorid Flux Liquid
Molten Salt Reactor Install.



Accelerator Experimental facility
Accelerator Beam Lines
Ion Sources installation
Neutron Source Platform GENESIS
→ research and irradiations



LPSC : facilities and infrastructures

Assembling Mounting Hall

Assembling & Mounting
Testing, integrating

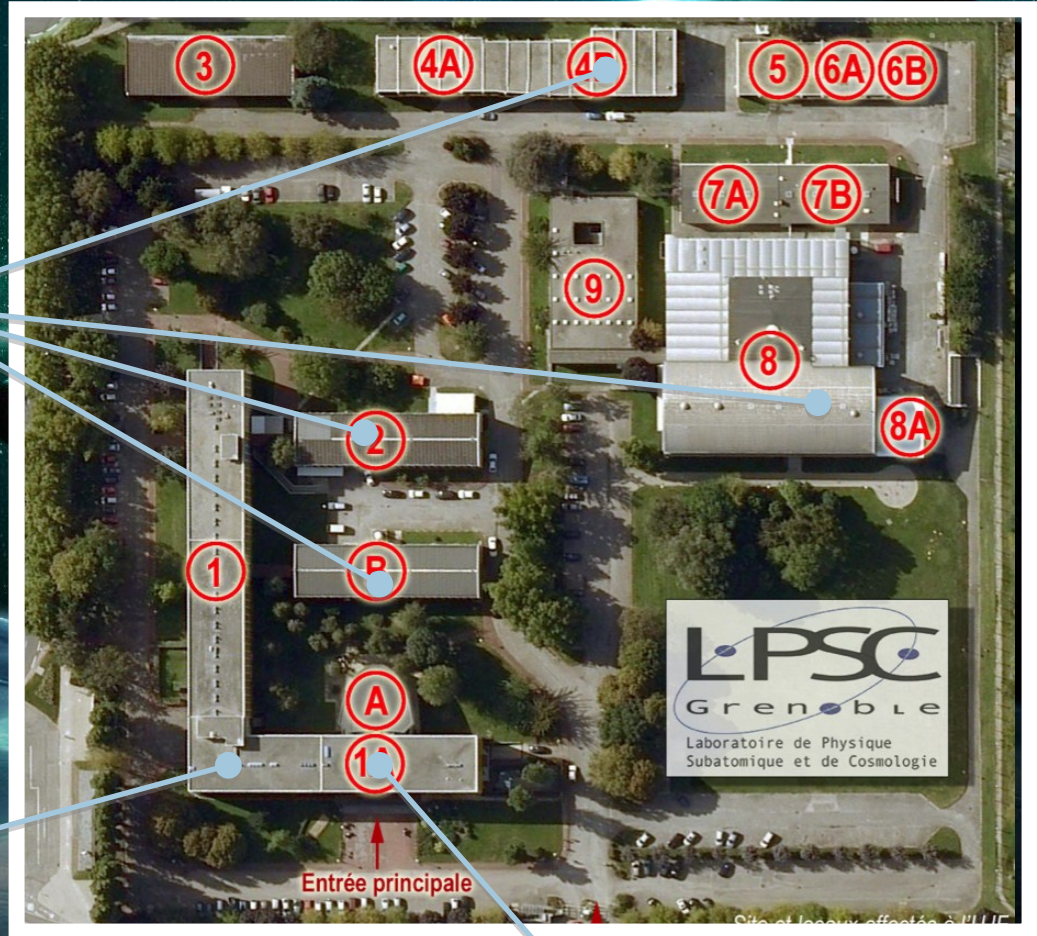


Computing Center

Tier2 for LHC experiments
CPU : 83 servers, 1200 cores,
Storage : 16 servers, 2 Po



23K HEPSPC06



Academic Training Platform

University, Eng. School, CNRS
Subatomic Physics & detection
400 student / year L-Master
Simulation of REP reactors



Outline

Sciences at the LPSC

- ...Particle Physics & Hadronic Physics
- ...Astroparticle & Cosmology
- ...Accelerator, ion sources, plasma
- ...Nuclear for Reactor Physics & Medical Application

I. Particle Physics

ATLAS team

Research fields : Higgs boson physics, Top quark physics, New Physics search (YY, Y-jet, DM)

ALICE team

Research fields : γ -Jet, γ -hadron correlations, b-flavoured jet reconstruction

Theoretical Particle Physics team

Research fields : Higgs boson Physics, New Physics search, QCD lattice, nuclear PDF

Ultra-Cold Neutron team

Project n(2)EDM : Search for neutron electrical dipolar momentum

Project GRANIT : Determination of quantum wave function in gravitational potential

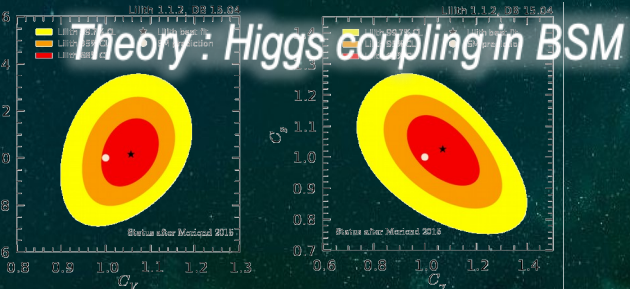
STEREO Team

Research field : Sterile neutrinos search

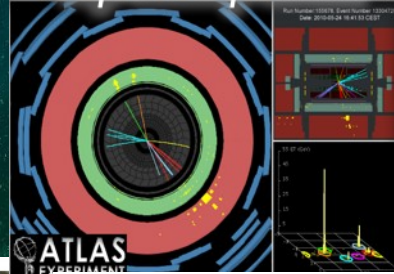
ILC Project

Research field : preparation for the next linear e+e- collider; higgs physics; calorimetry,

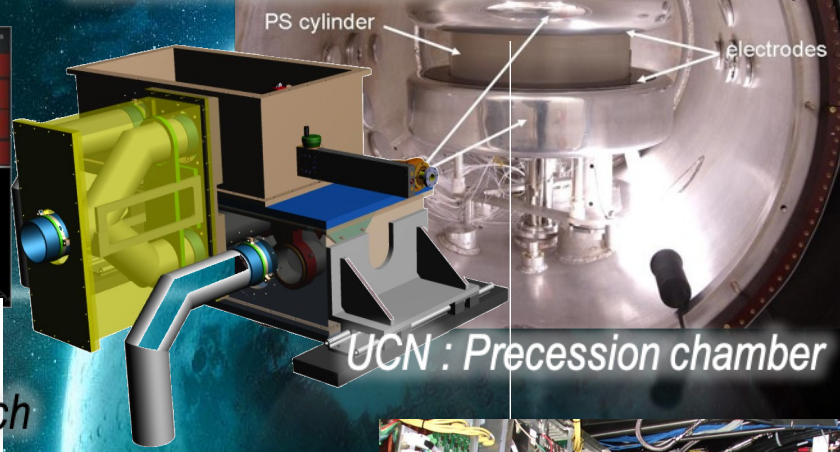
I. Particle Physics



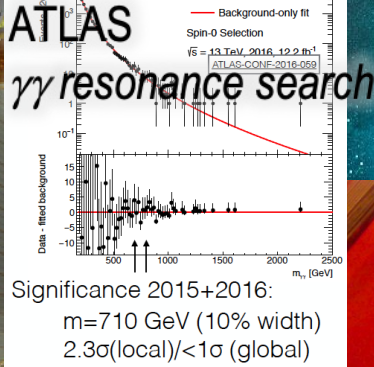
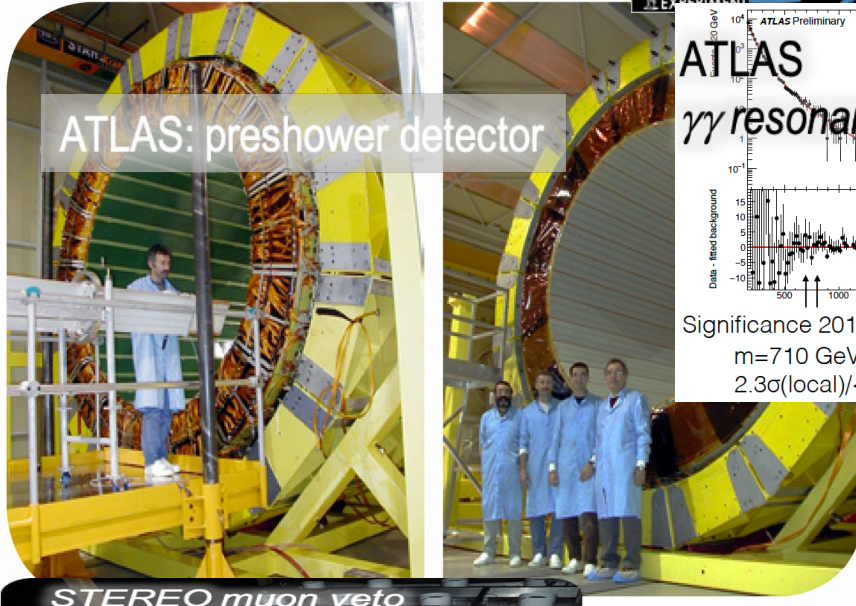
Top-antitop event



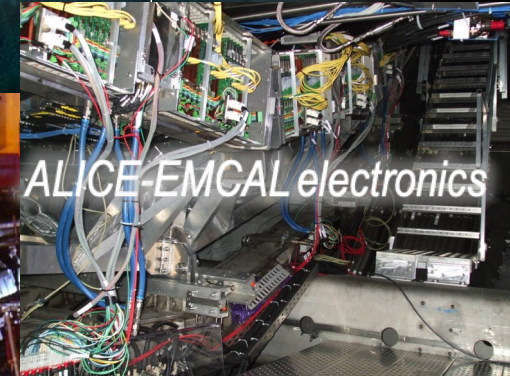
nEDM : Switch for UCN



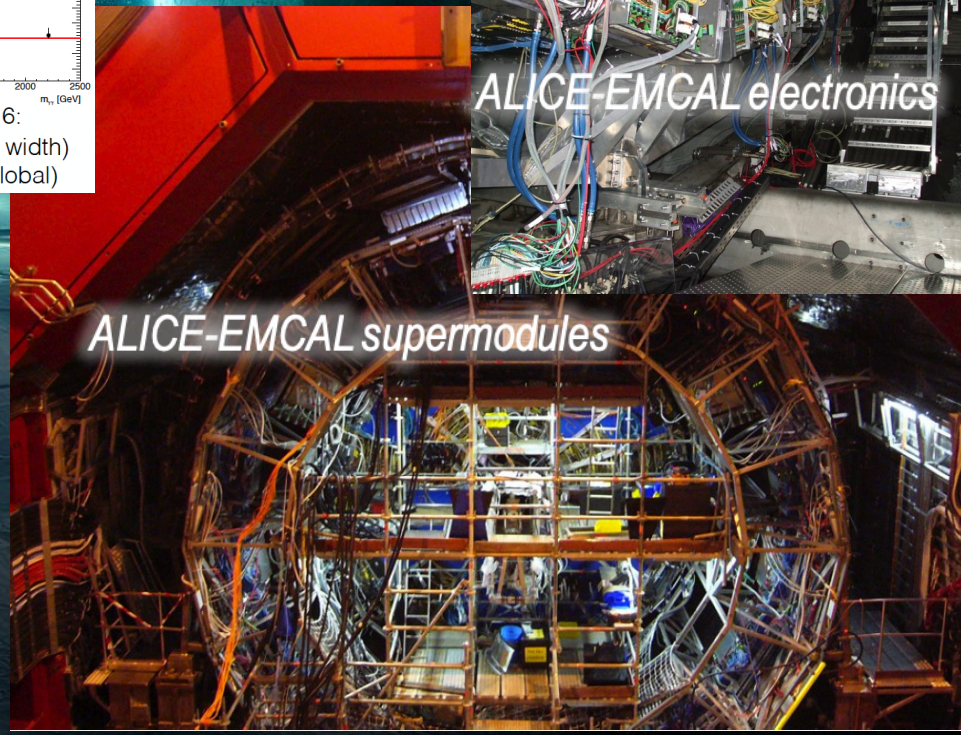
ATLAS: preshower detector



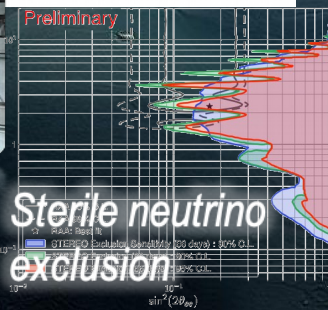
ALICE-EMCAL electronics



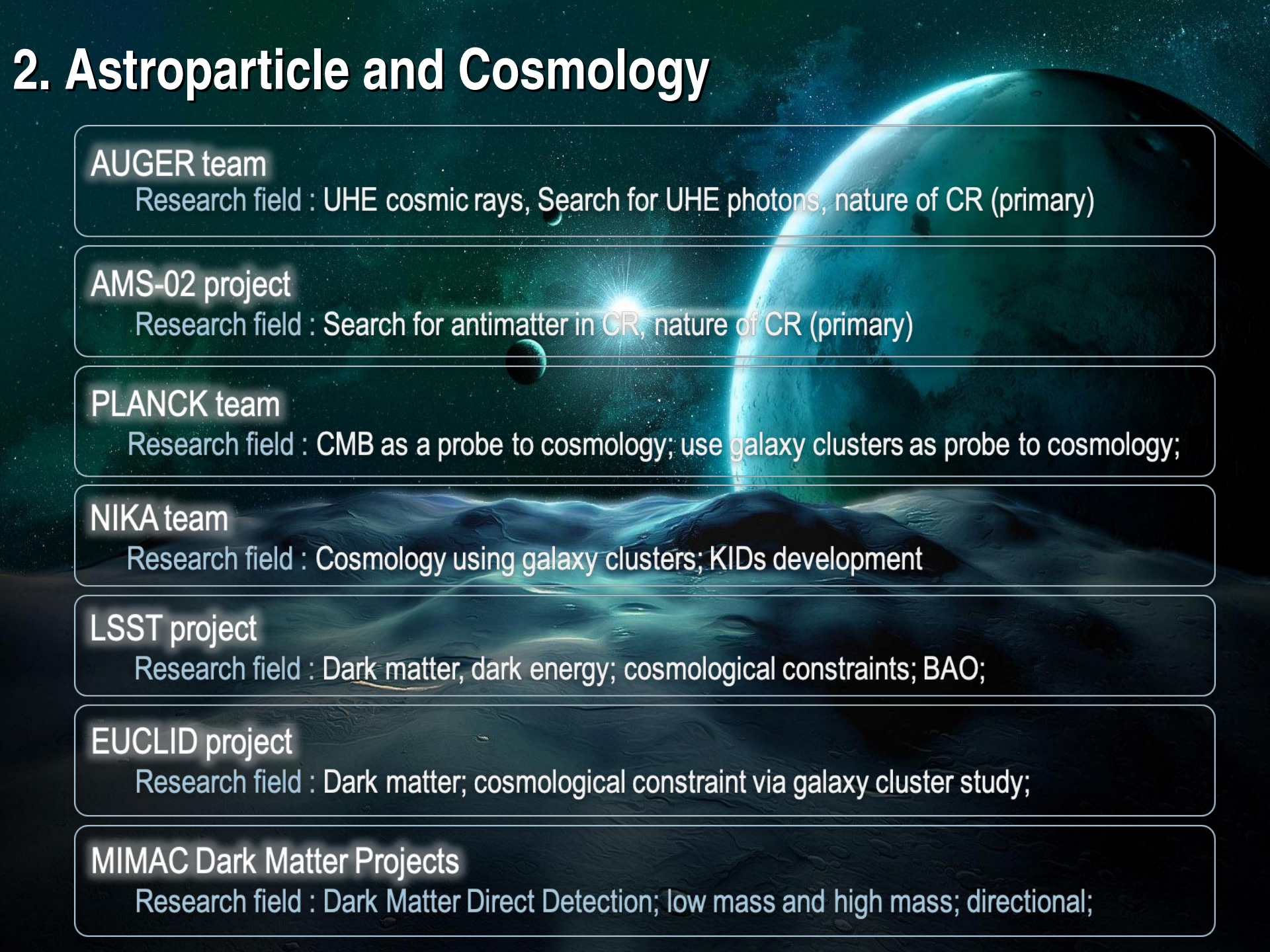
ALICE-EMCAL supermodules



STEREO muon veto



2. Astroparticle and Cosmology



AUGER team

Research field : UHE cosmic rays, Search for UHE photons, nature of CR (primary)

AMS-02 project

Research field : Search for antimatter in CR, nature of CR (primary)

PLANCK team

Research field : CMB as a probe to cosmology; use galaxy clusters as probe to cosmology;

NIKA team

Research field : Cosmology using galaxy clusters; KIDs development

LSST project

Research field : Dark matter, dark energy; cosmological constraints; BAO;

EUCLID project

Research field : Dark matter; cosmological constraint via galaxy cluster study;

MIMAC Dark Matter Projects

Research field : Dark Matter Direct Detection; low mass and high mass; directional;

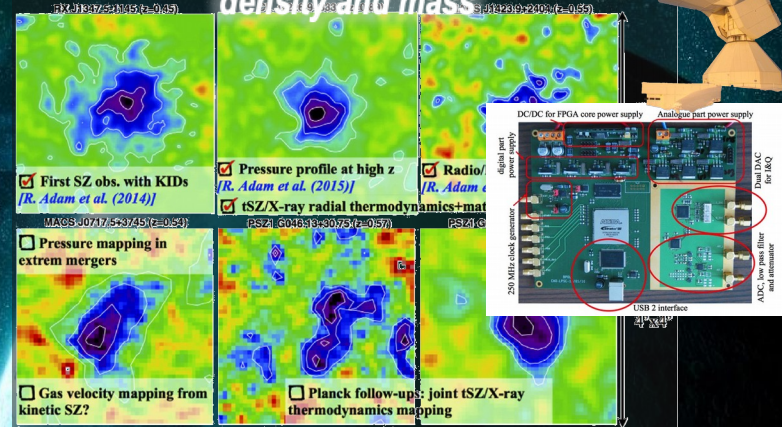
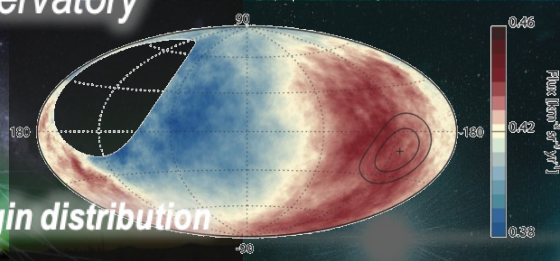
2. Astroparticle and Cosmology

NIKA : Radial profiles for galaxy cluster pressure, density and mass

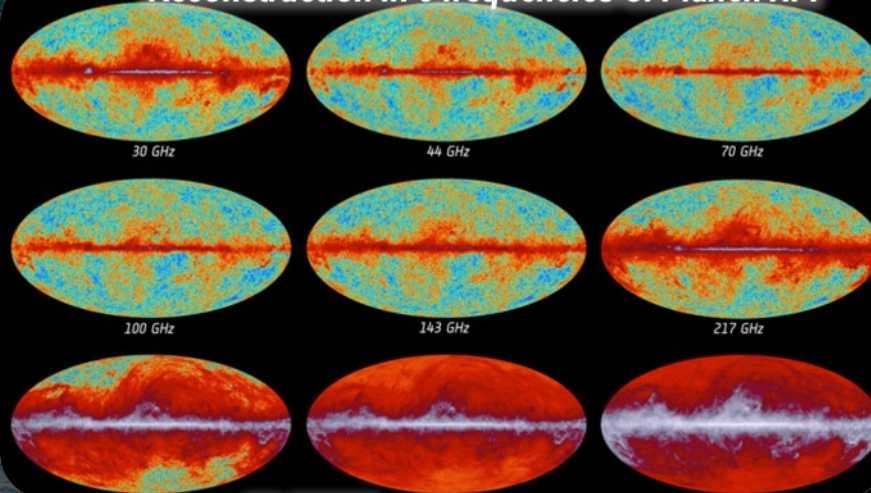


AUGER Observatory

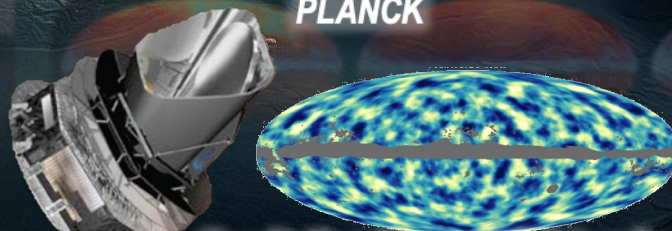
AUGER : UHE origin distribution



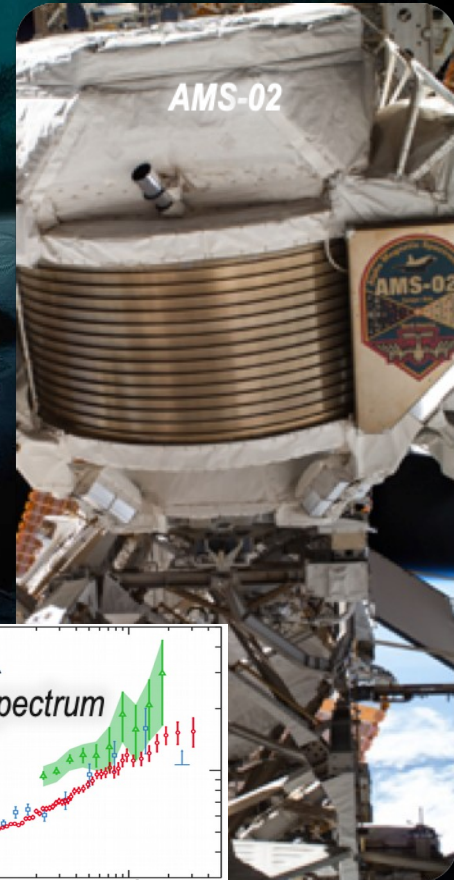
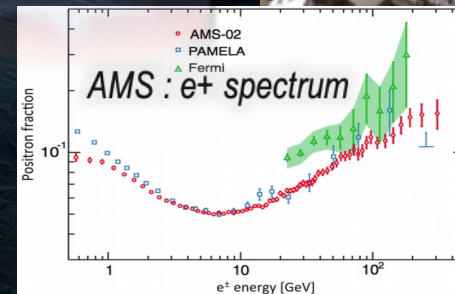
Reconstruction in 6 frequencies of Planck HFI



PLANCK

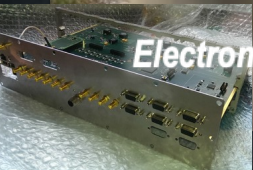


Gravitational potential determined using gravitational lensing effects



AUGER : upgrade

Electronics for SD



MIMAC : DM Directional search

3. Nuclear for Energy and Health

The background of the slide is a space-themed image. It shows a large, bright blue and white planet (Earth) on the right side, partially obscured by the dark, cratered surface of the Moon in the foreground. A bright sun or star is visible in the center, creating a lens flare effect. The overall color palette is dominated by blues, greys, and blacks, with a starry background.

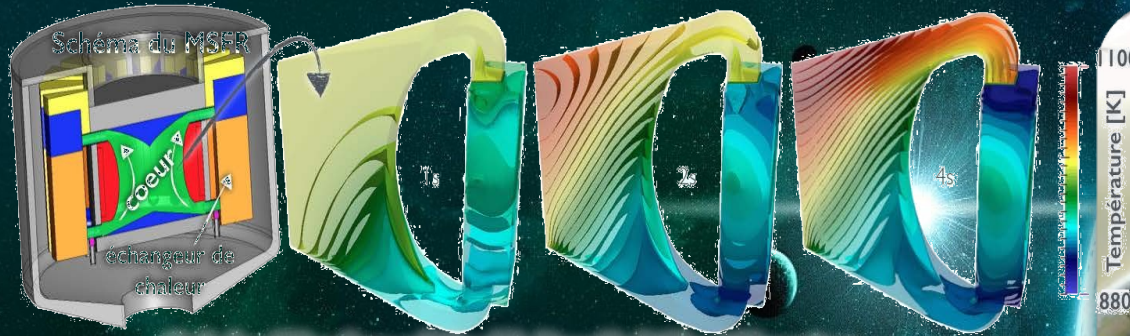
Nuclear Reactor team

Interdisciplinary Mission framework of CNRS (CEA, IRSN EDF, ...)

Medical Application team

Regional synergies with hospital, ESRF, ILL and national coll (ARONAX, GANIL)

3. Nuclear for Energy and Health



*Original Design of the Molten Salt Fast Reactor
And associated thermic-neutron thermic studies*



Beam profiler at the Grenoble Hospital



Diamond test bench at GENESIS (LPSC)



4. Accelerator, ion sources and Plasma

Accelerator and ion sources team

Accelerator in European FP7-H2020 framework and national program context

Low Energy Beam Transport line for ADS project (MYRRHA, Mol in Belgium)

Source of pulsed neutrons beam for irradiation and nuclear data : GENESIS platform

Power Coupling devices for Spiral-2 (GANIL program)

Ion sources, ECR, boosters

Ion sources for Spiral2 at GANIL : PHOENIX V2 and V3

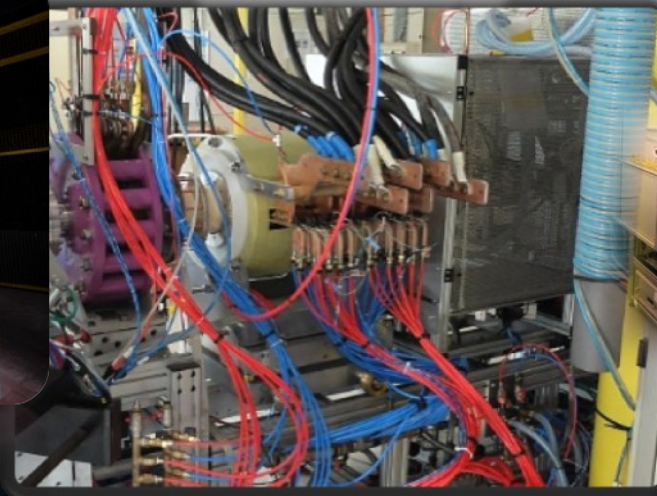
Charge Booster 1+n+

High frequency ECR ion sources (60 GHz)

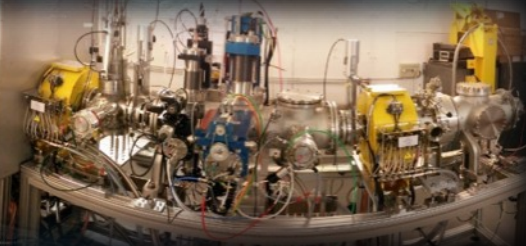
GENESIS platform



Source PHOENIX V3



LEBT MYRRHA



5. LSM as a National Platform

Merger of LPSC and LSM : since 01/01/2019

Framework of a National Platform : Governance

SteeringBoard with IN2P3 and a specific Scientific Committee

Scientific Director : Jules GASCON (IPNL, UCL Lyon I)

Executive Director : Christophe VESCOVI (LPSC)

Platform for DM and $2\beta 0\nu$ experiments

DM : EDELWEISS/CUPID, NEWS, MIMAC + DAMIC

$2\beta 0\nu$: SuperNEMO, SHIN, TGV, etc...

On-going Projects :

--- R&D platform dedicated to exploration, test and validation
of new technologies for future projects

--- Extension of space devoted to Acquisition (current experiment)

Platform for γ -spectrometry

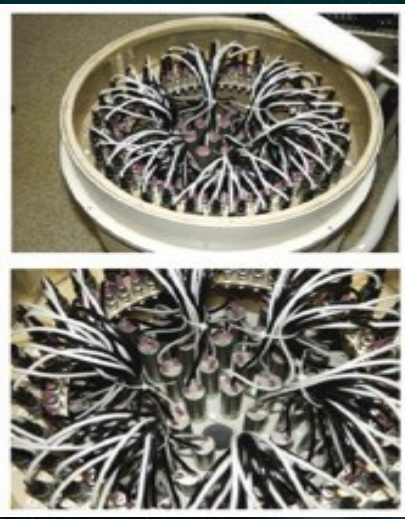
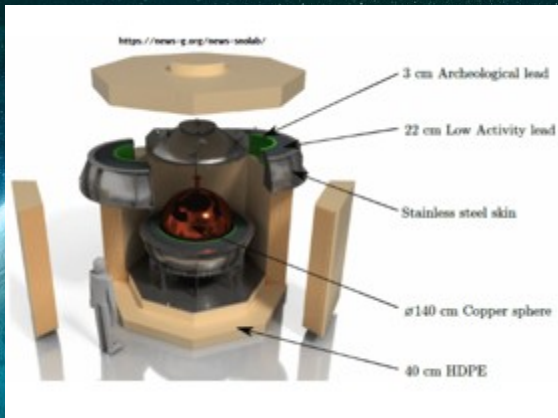
16 Ge detectors installation for ultra-low radioactivity material study and selection
and measurements dedicated to geosciences, biology and medical applications

On-going project : PARTAGe

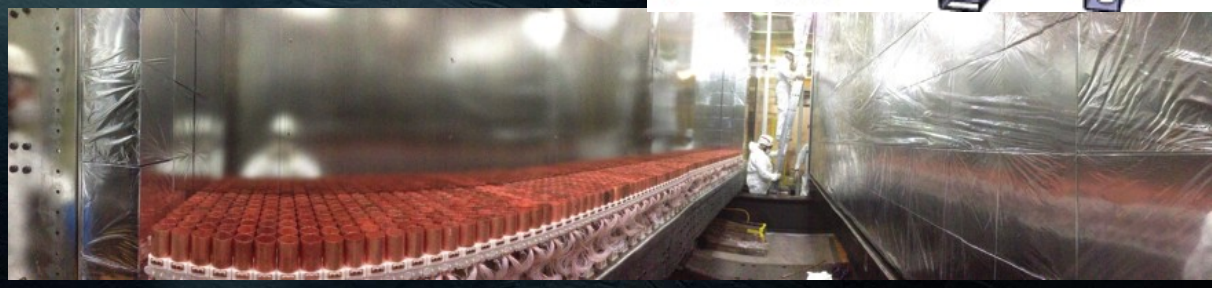
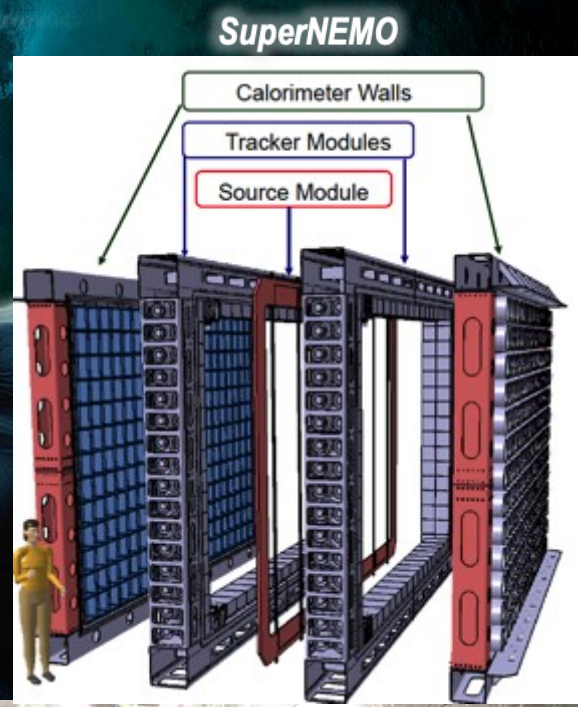
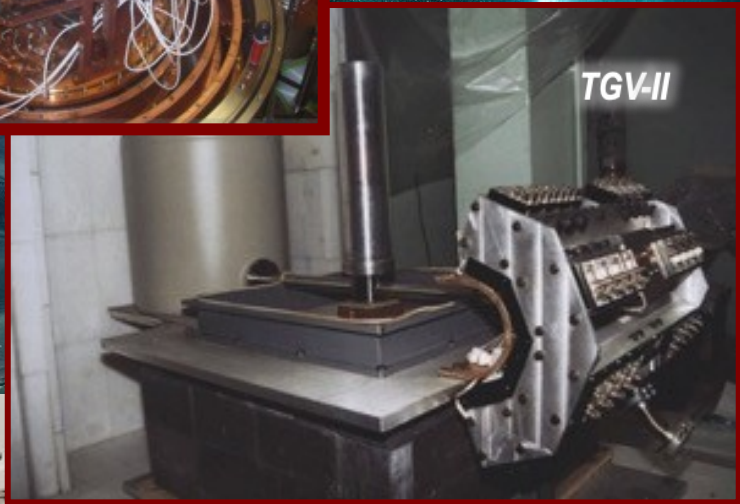
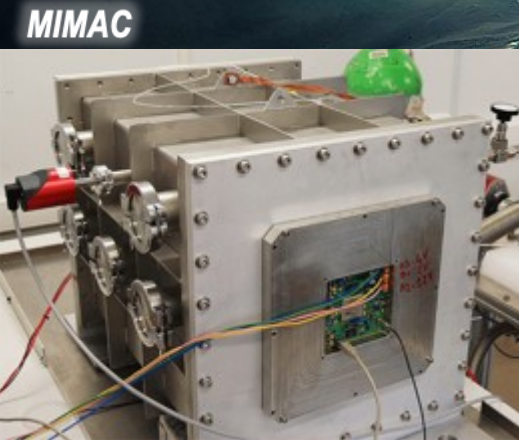
--- Platform with anti-radon facility, automatized sample analyses etc...

5. LSM as a National Platform

NEWS



SHIN: Search of Super Heavy Element in Nature



A futuristic space scene featuring a large, dark planet with a bright blue horizon on the right. In the center, a bright star with a lens flare shines against a dark, star-filled background. Two smaller planets are visible in the distance. The foreground shows a dark, cratered surface, likely the moon, with a glowing blue light reflecting off the ground.

Welcome to the LPSC and LSM !...