

Dapnia

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Laboratoire de recherches sur les lois fondamentales de l'Univers

Laboratory of research into the fundamental laws of the Universe

A department of the physics division (DSM) of CEA in Saclay

Dapnia: Human resources and budget

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- About 200 physicists
- About 430 engineers, technicians and staff
- About 130 post-docs, PhD students and other visitors

- Budget: about 85 M US \$

Laboratory characterized by a:

Concentration of human resources

Heavy equipment. Advanced technologies

Project oriented organization, inside CEA,

a technology dominated institution

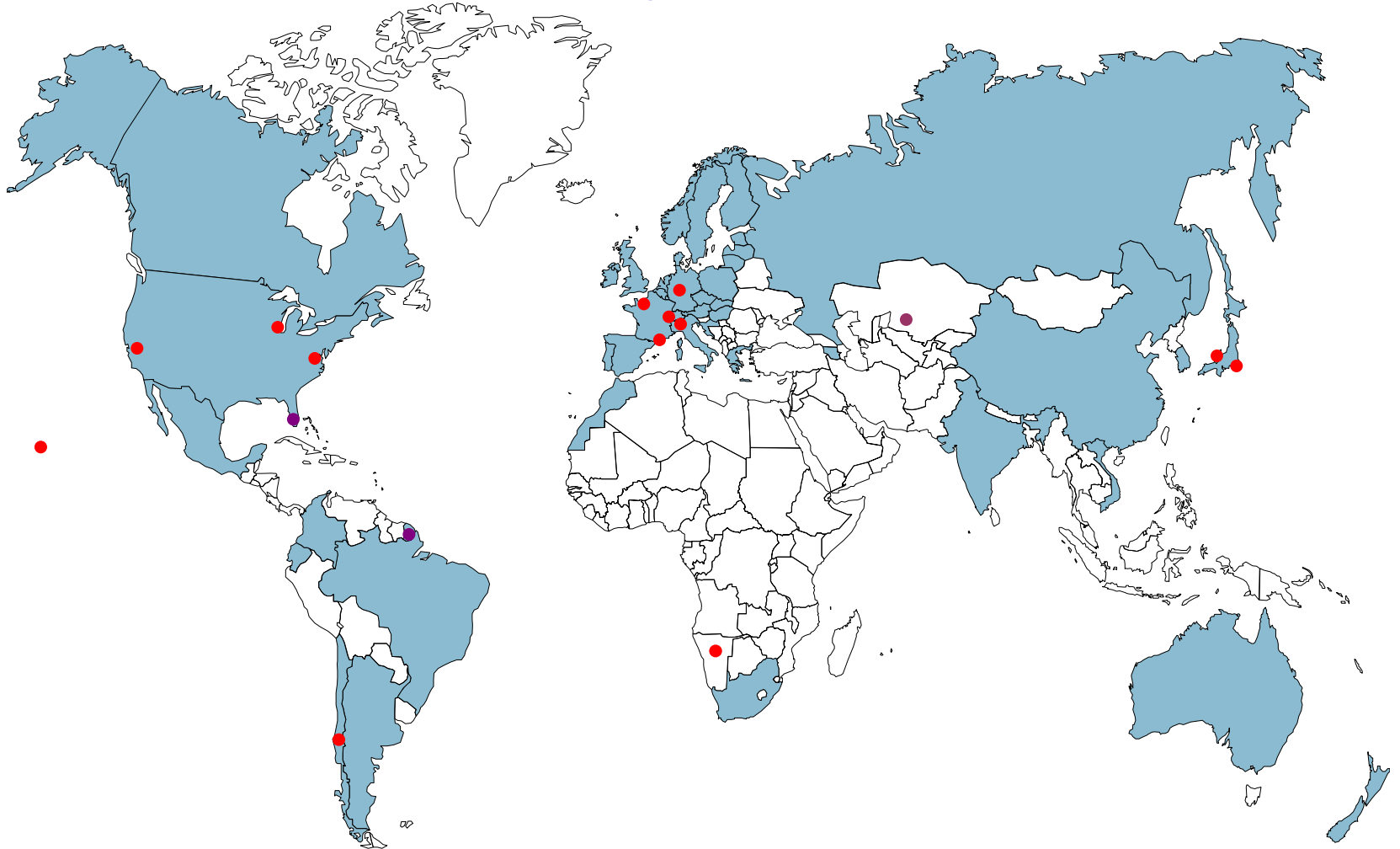
Laboratory of research into the fundamental laws of the Universe

*Participation to international programs:
collaboration with other french and foreign laboratories*

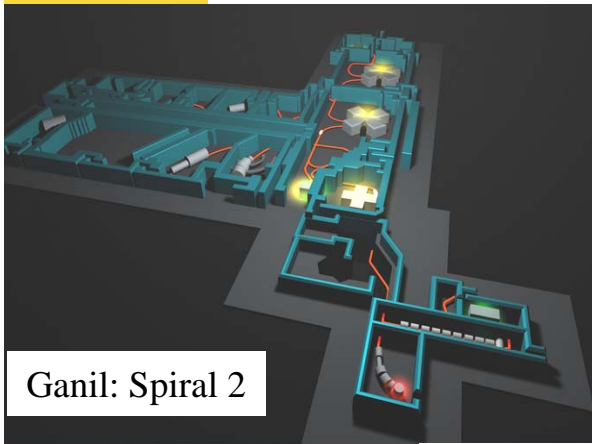
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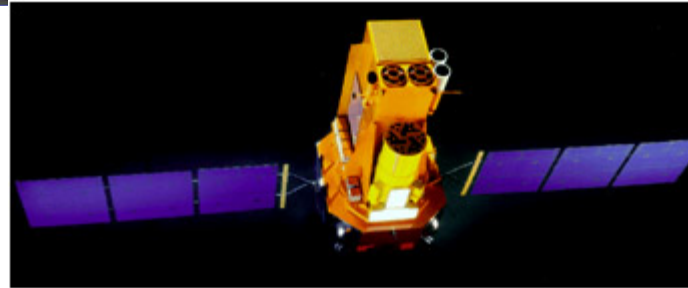


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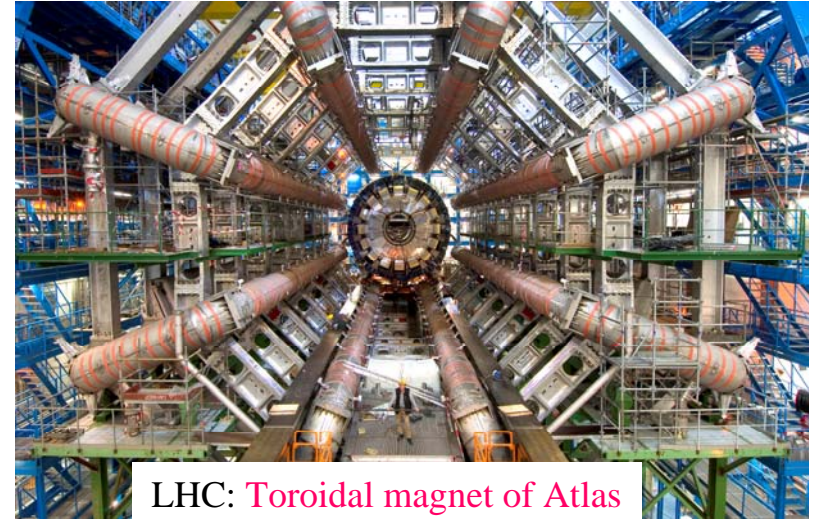


Ganil: Spiral 2

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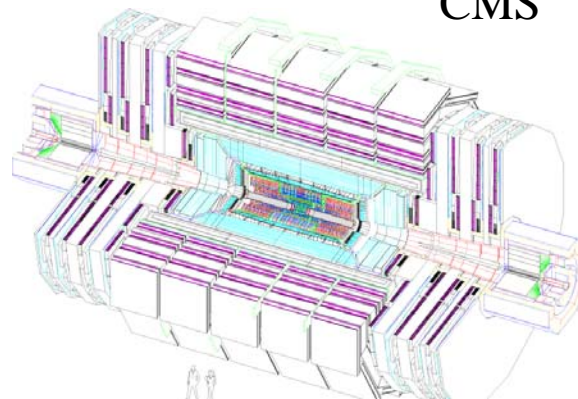
Integral observatory



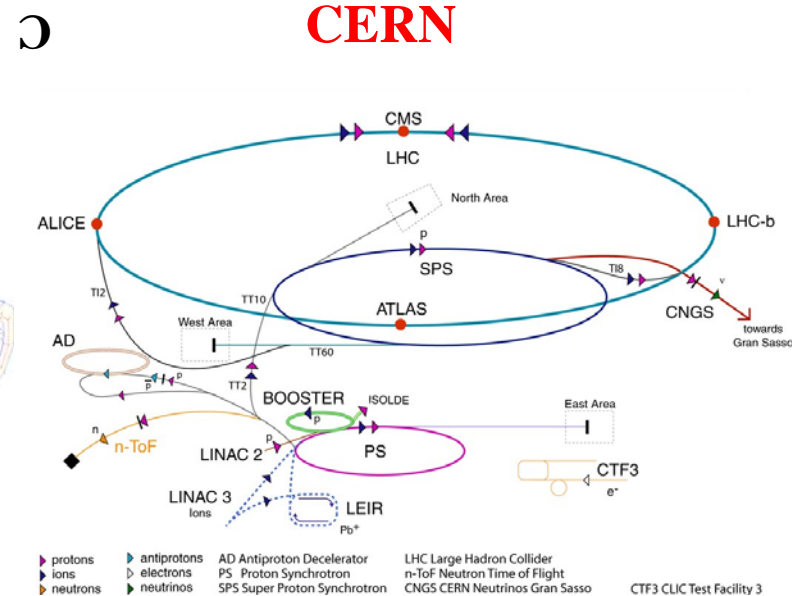
LHC: Toroidal magnet of Atlas



esa
HERSCHEL
Space Observatory
Exploring the formation of galaxies and stars
Découvrir la formation des galaxies et des étoiles



CMS



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Eight globally consistent and ambitious research programs:

Ultimate constituents of matter

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*Tests, extensions of
the Standard Model,
in particular,*

*the origin of masses
and the Higgs
particle (Tevatron,
ATLAS, CMS)*

*The nucleon
structure
(Jlab and Compass)*

*Neutrinos
oscillations*

*(Double Chooz and
T2K experiments)*



SuperKamiokande detector in Japan

The energy content of the Universe

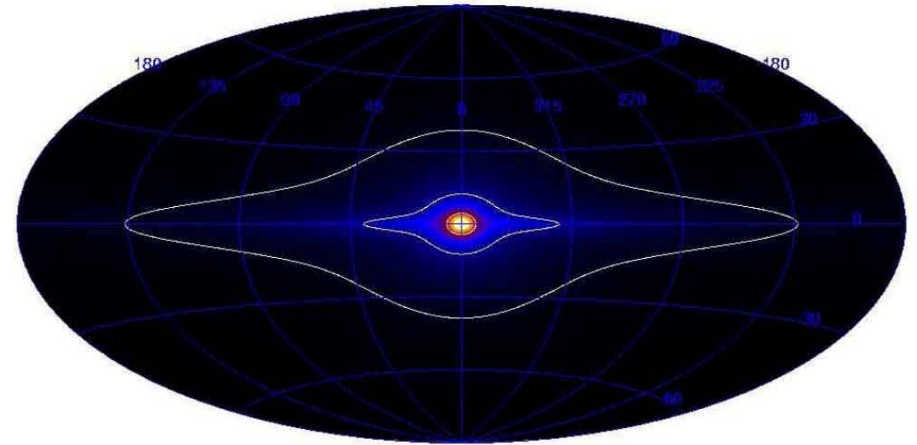
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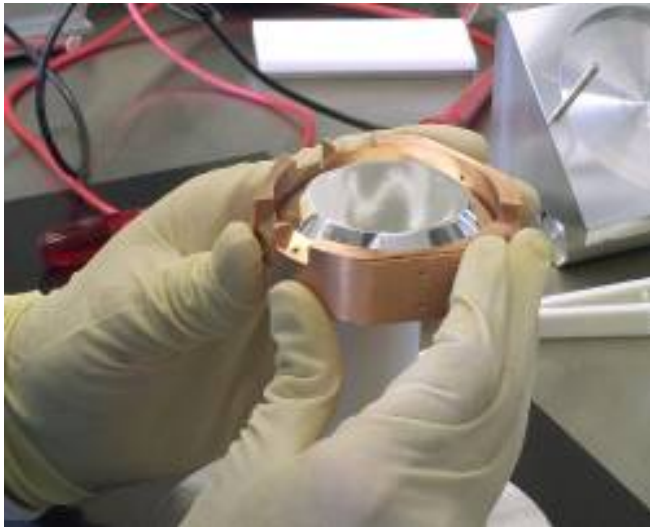
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*Antimatter disappearance
and CP violation
(Babar, NA48, Integral)*

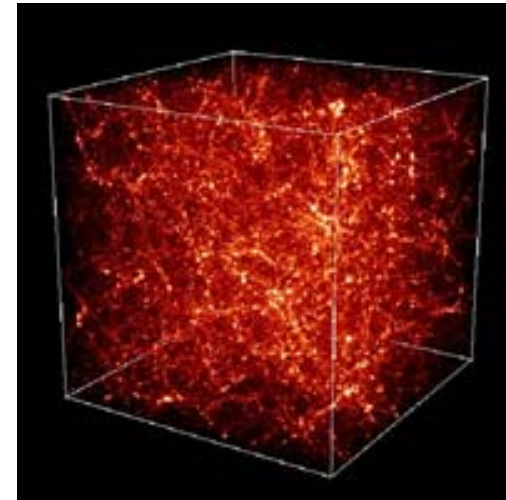
*Dark matter, dark energy
and cosmology*



*Integral :
Antimatter in the Galaxy*



*Edelweiss :
Search for dark
matter*



Structuration of the Universe

Cosmology and formation of large structures in the Universe

Formation and evolution of galaxies

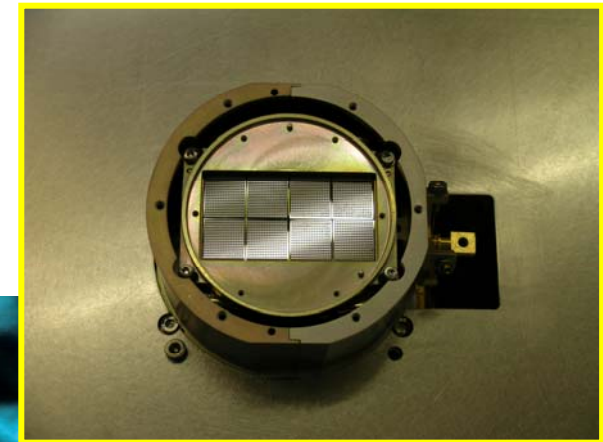
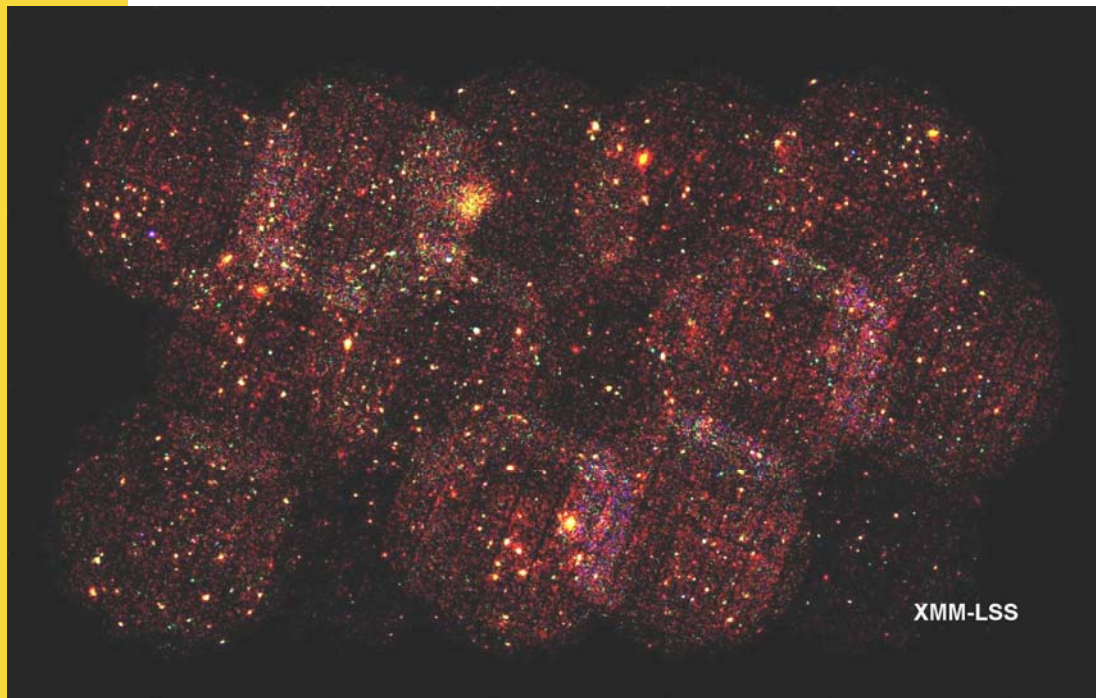
XMM-LSS :

7 billion years ago

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Birth, life and death of stars

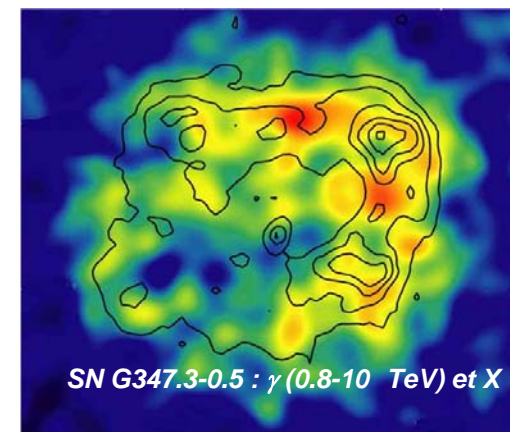
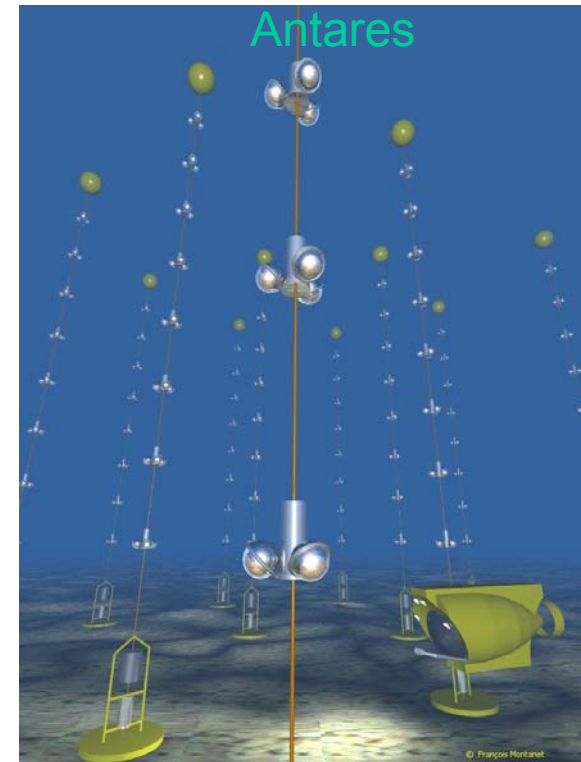
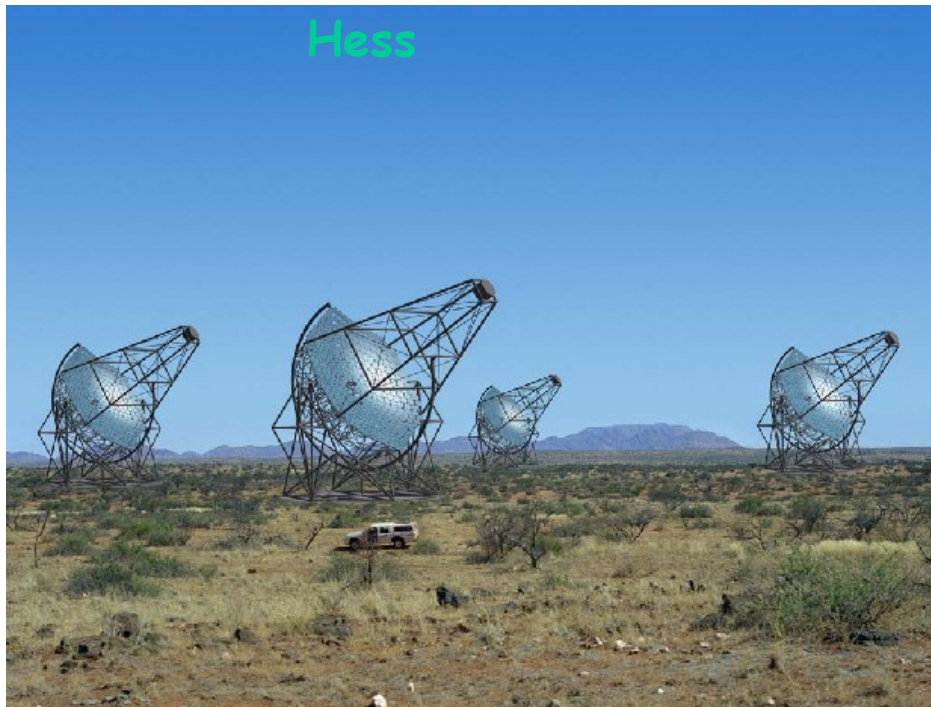
*Formation and evolution
of stars and planets*

*Violent phenomena
in the universe
Physics of laser
produced plasmas*

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Extreme states of nuclear matter

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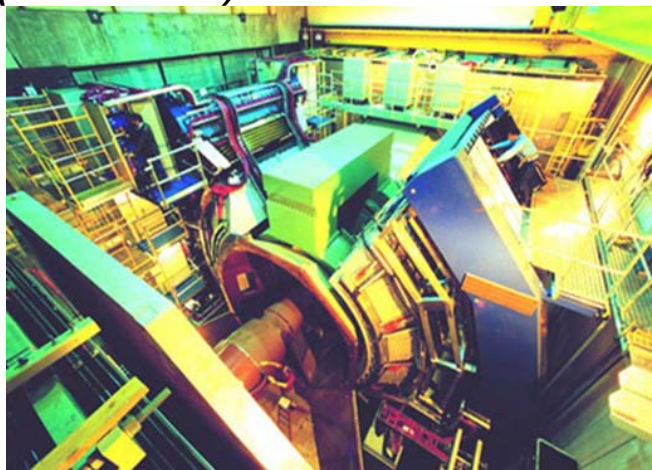
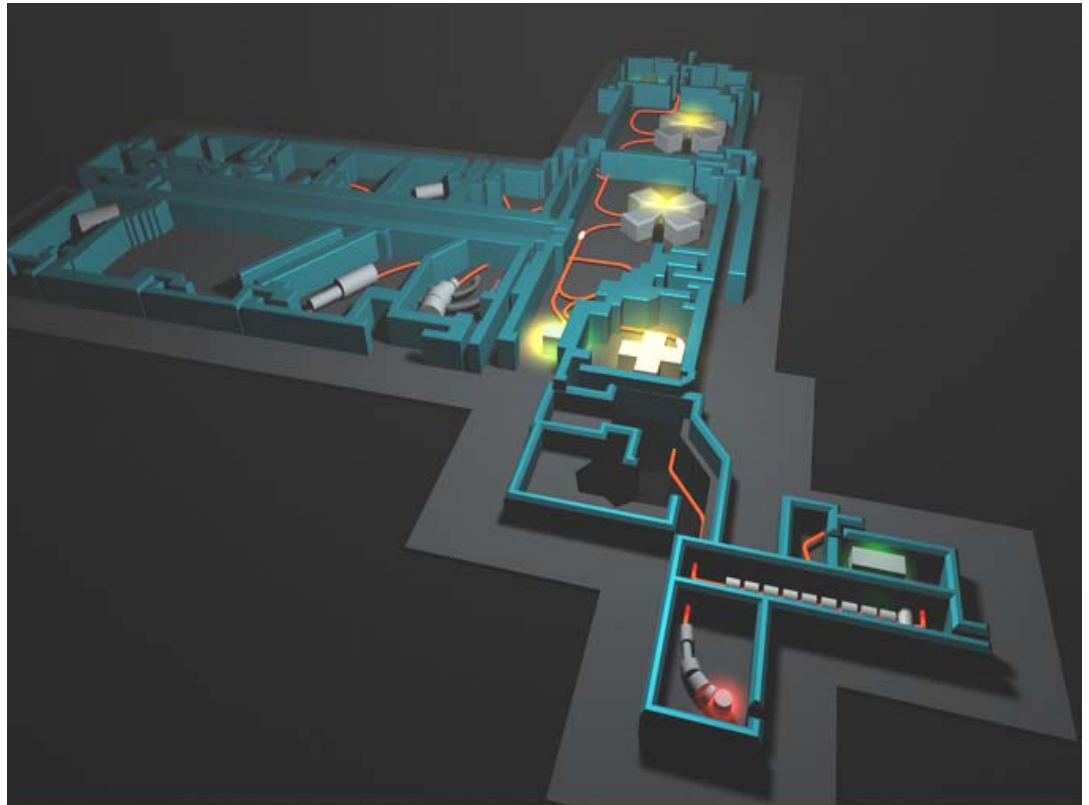


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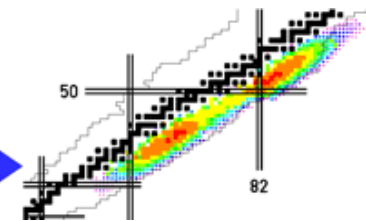
*Exotic, super-deformed,
with halos... nuclei*

*Phase transitions in
nuclear matter:
Quark-gluon plasma*

**PHENIX detector at RHIC
(Brookhaven)**



Spiral2



Physics for nuclear energy

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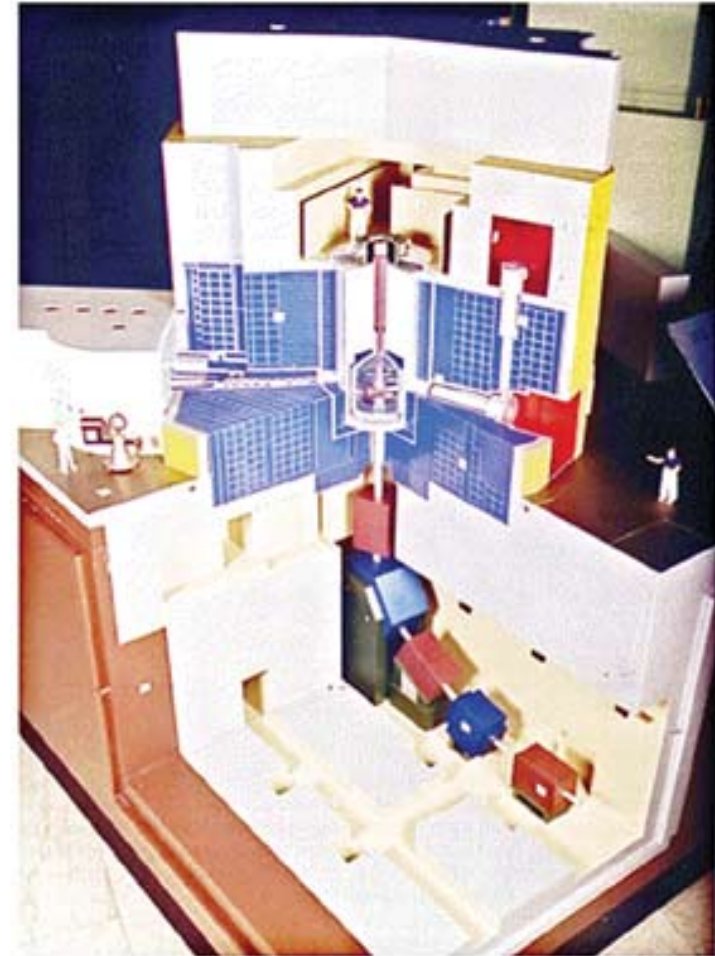
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Neutronics

Basic nuclear data

Transmutation studies

Fusion (ITER, IFMIF-EVEDA)



Neutron spallation source Megapie at PSI.

Futur instruments for physics

GLAST



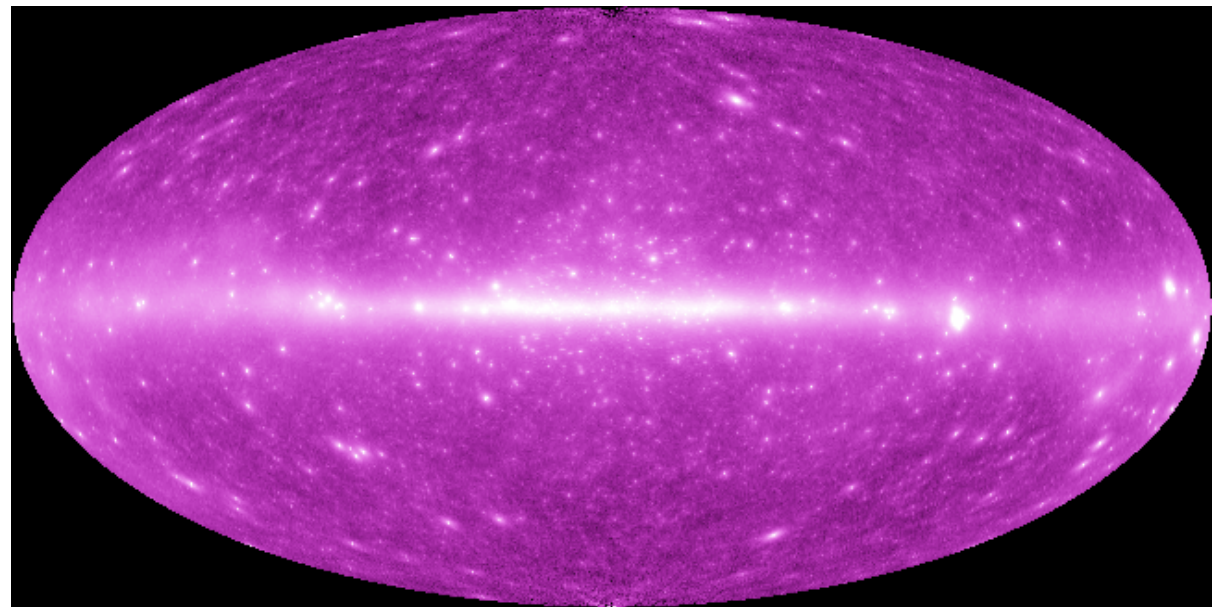
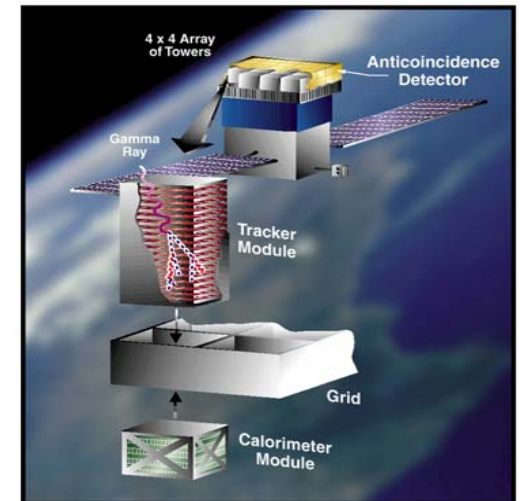
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- ### CEA Contributions
- Prototypes for the Crystal Detector Element for LAT
 - GLAST-LAT catalogue of sources
 - Diffuse emission and extragalactic-ray background



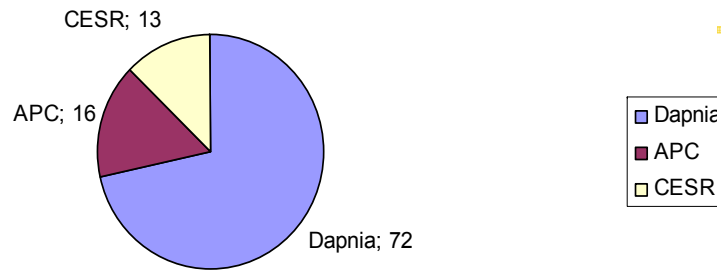
Simulated GLAST Sky Survey ($E > 100$ MeV)

Futur instruments for physics

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Symbol X: phase A

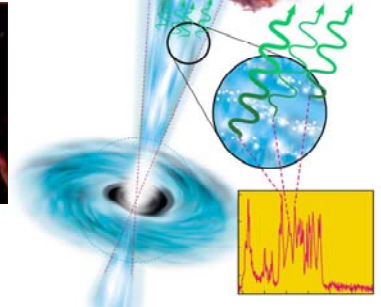
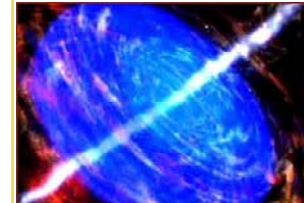


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ECLAIRS

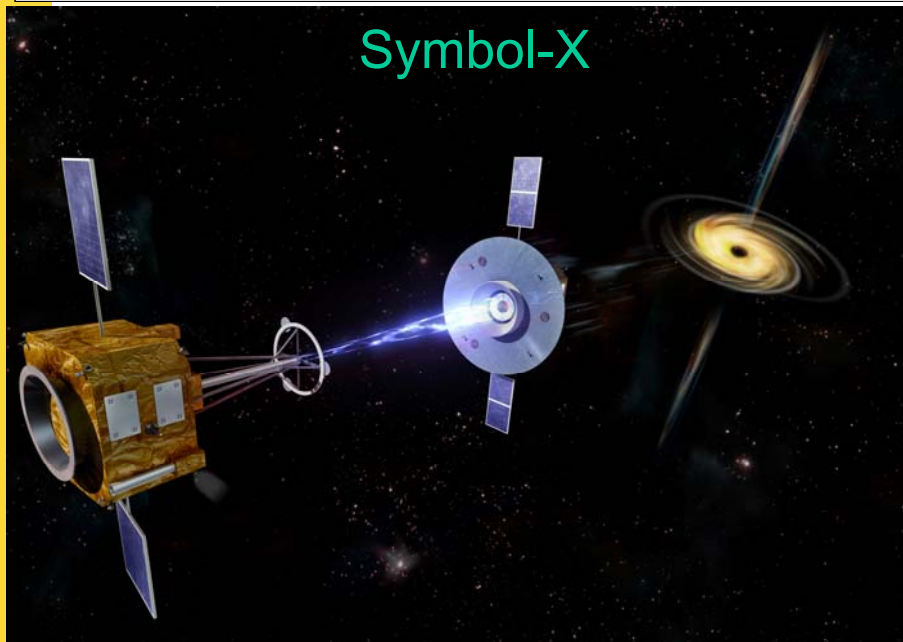
Microsatellite pour l'étude multi-longueurs d'onde de l'émission prompte des sursauts gamma

Émission rémanente infrarouge, visible, X
Émission prompte gamma



CEA DSM Dapnia

French laboratories contributions to ECLAIRS : 103 FTE including Dapnia's contribution 71 FTE



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Futur instruments for physics

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New, improved detection systems

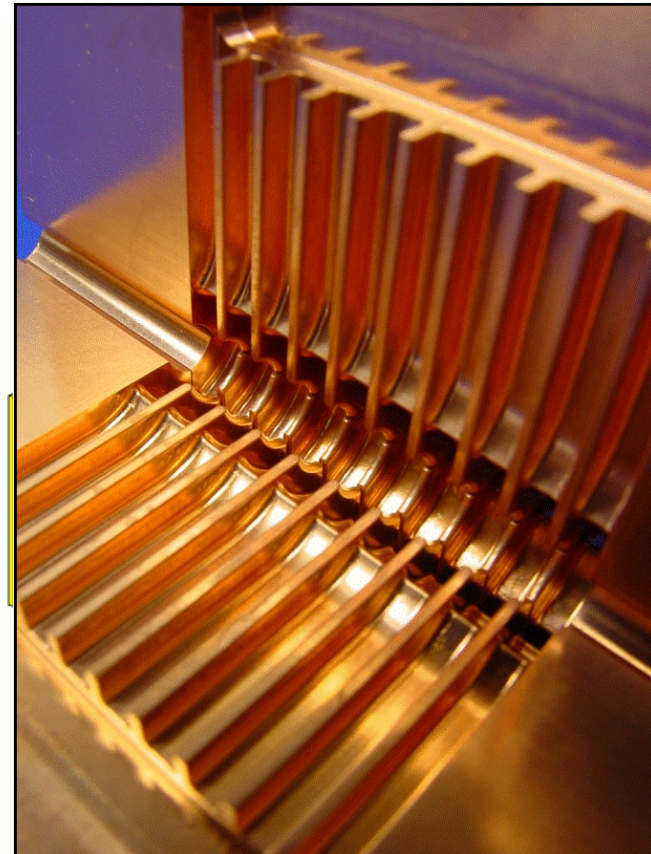
Signal processing and software

R&D in process control

Future particle accelerators

Superconducting magnets

Cryogenic test stations



er

oil

ber

6 m³
on



Futur instruments for physics

The Grid W-LCG: Tier 1 in Lyon and Tier 2 around Paris (GRIF)

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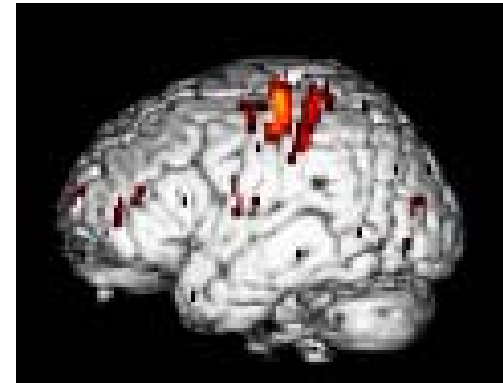
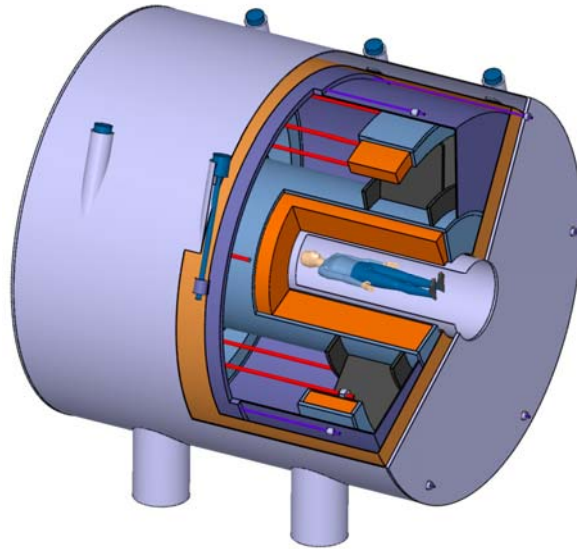
A map of the worldwide LCG infrastructure operated by EGEE and OSG.

Applications and developments for other communities

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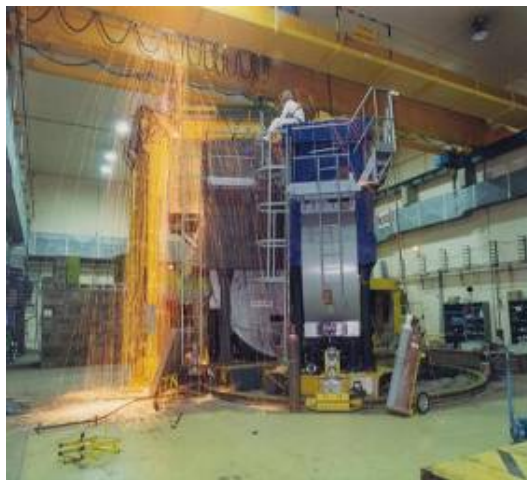
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The Iseult project:
A 11.7 T full-body
superconducting
magnet for MRI

Physics and medicine



Light sources

*Dismantling large
physics instruments*



Soleil cavities