SPIRAL2 ARRIVAL CONSEQUENCES ON THE EXISTING GANIL INSTALLATION

F. Chautard
(on behalf of the Accelerator Service)

♦ GANIL OPERATION STATUS
♦ SPIRAL1 / UPGRADE
♦ SPIRAL2 INTERFACES
EXOTIC BEAM PRODUCTION AT GANIL: SPIRAL1 SINCE 2001

Ion sources

CSS1

CSS2

Production cave

CIME
RUNNING STATISTICS 2001-2011

GANIL per year: 32 weeks within 4 runs: 5700h of operating time. Leading to 7200h of beam time for users (multi-beam effect)

SPIRAL since 2001: 8500h of exotic beams. More than 30 exotic beams produced

Availability rate = 1 – failure rate over 11 years: 90.2%

Availability in 2011: 93.3%

Scheduled physics time in 2011: 98.4%

Great effort on maintenance
AFTER 10 YEARS OF SPIRAL1…

♦ The physicists are waiting for an extended range of available radioactive beams
♦ Keeping the existing capability of production
♦ And is an alternative while waiting for SPIRAL2 beams
PROJECT UPGRADE SPIRAL1 : 2014

Actual Nanogan III

Mono/NanoNaKE

alcalii ions 1+/n+

FEBIAD VADIS

Non metal. N+ M = 4→90

Metal. Ions 1+

CSS kW beam
Initially a **Simple and Good idea**

but:

♦ **Major modification of the existing installation:**
  - New radioactive beams meaning an update of the GANIL Safety report
  - Modification taking into account the new security regulation

**Take times… Then when ready …**

♦ **Human resources no more available and on SPIRAL2 project**

♦ **Consequence on the planning:** 2 years delay
NEED TO CHANGE PRIORITIES

3 missions of the Accelerator Service:

♦ Operation

♦ Accelerator Development

♦ Participation of the SPIRAL2 project (growing fast)
PREPARING FOR SPIRAL2: STRATEGY

♦ Reduction of the running time: to free human resources from the existing accelerators (10 engineers, 18 operators…)

2010: ~8 months
2011: ~6 months
2012: ~4 months
2013: ~6 months
2014: ~8 months

♦ Reduction of new beam developments

♦ Reduction of maintenance time of the existing machine

♦ Limitation of new developments in accelerator: UPGRADE SPIRAL1

Concentration of forces on the new project
EXPLOITATION REDUCTION

BEAM TUNED PER YEAR

YEARS


BEAMS

0 10 20 30 40 50 60

24 25 31 33 40 34 53 45 45 47 33
... BUT STILL EFFECTIVE

RATIO OF BEAM AVAILABLE TO PHYSICS over THE SCHEDULED ONE

<table>
<thead>
<tr>
<th>YEARS</th>
<th>Ratio</th>
</tr>
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<tbody>
<tr>
<td>2001</td>
<td>84.7%</td>
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<tr>
<td>2002</td>
<td>85.0%</td>
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<tr>
<td>2003</td>
<td>91.5%</td>
</tr>
<tr>
<td>2004</td>
<td>91.6%</td>
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<td>2005</td>
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<tr>
<td>2009</td>
<td>96.9%</td>
</tr>
<tr>
<td>2010</td>
<td>92.6%</td>
</tr>
<tr>
<td>2011</td>
<td>98.4%</td>
</tr>
</tbody>
</table>
SHORT OVERVIEW OF THE SPIRAL2 PROJECT
SCIENTIFIC CASE OF GANIL/SPIRAL 2

- Nucleosynthesis in the Universe
- Heavy and Super Heavy Elements
- Neutrons for science
- Atomic & solid state physics
- Radiobiology & Isotope production

ECPM 2012 – PSI – F. Chautard
The SPIRAL2 facility

SPIRAL2 is one of the ESFRI list projects (45 most important EU research infrastructure projects)

LINAC:
- 33 MeV p
- 40 MeV d
- 14.5 MeV/u H.I.

Neutrons For Science

S3 separator-spectrometer

HRS+RFQ Cooler

RIB Production Cave
- Up to $10^{14}$ fiss./sec.

A/q=2 source
- p, d, $^3$,$^4$He 5 mA

A/q=3 H.I. source
- Up to 1 mA

DESIR Facility
- low energy RIB

Existing GANIL facility

CIME cyclotron

For Science

SPIRAL2 is one of the ESFRI list projects (45 most important EU research infrastructure projects)
CONSTRUCTION OF SPIRAL2 IN 2 PHASES

Phase 1

Phase 2
CONSTRUCTION DE SPIRAL2 EN 2 PHASES

SPIRAL2 Phase 1

SPIRAL2 Phase 2

Existing GANIL facility
RIB Production and Transport

- LINAC beam
- Production hall
- Identification Station
- 1+ RIB to DESIR Hall
- 1+ beam transfer lines
- ECR Charge booster
- N+ beam transfer lines to CIME existing cyclotron
- Maintenance and waste management area
- High Resolution Separator

Energy range of SPIRAL2 ISOL RIB: ≤ 60keV and 1-15 MeV/u
Concerning SPIRAL2 phase1:
• **Phase 1 decree signed may 8, 2012**
• More or less all the equipments are under manufacturing or tests.
• All the tests in laboratories are very important to debug problems before final installation at GANIL.
• Buildings construction has started (pictures next)
• The very important task now is to prepare the installation phase of equipments in buildings.
• Commissioning started in 2013

Concerning SPIRAL2 Phase2:
• Preliminary studies of sub-systems are completed.
• All detailed studies to be finished by the end of 2012.
• Beginning of construction of equipments and buildings at the beginning of 2014.
STATUS OF BUILDINGS CONSTRUCTION
Thank you for your attention