The Spiral2 Control System progress towards the commissioning phase
Outline

- Spiral2: a new Rare Ion Beam facility
- Building Progress
- Control System Architecture
- Development Organization
- Control System Deliverables
- Development Status
Spiral2 : a new Rare Ion Beam facility
Spiral2 : a new Rare Ion Beam facility

Spiral2 Accelerator:
2 ions sources, RFQ, superconducting linac

S3 experiment room:
Super Separator Spectrometer

NFS experiment room:
Neutron For Science
Spiral2: a new Rare Ion Beam facility

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- 2 ions sources, RFQ, superconducting linac

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<table>
<thead>
<tr>
<th>Q/A</th>
<th>I (mA)</th>
<th>Energy (Mev/u)</th>
<th>CW max beam power (KW)</th>
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<tbody>
<tr>
<td>Protons</td>
<td>1/1</td>
<td>5</td>
<td>2 - 33</td>
</tr>
<tr>
<td>Deuterons</td>
<td>1/2</td>
<td>5</td>
<td>2 - 20</td>
</tr>
<tr>
<td>Ions</td>
<td>1/3</td>
<td>1</td>
<td>2 - 14.5</td>
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Spiral2: a new Rare Ion Beam facility

**Phase 2: RIB production**

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**Spiral2 Accelerator:**
- 2 ions sources, RFQ, superconducting linac

**DESIR experiment room**

**S3 experiment room:**
- Super Separator Spectrometer

**NFS experiment room**
- Neutron For Science
May 2011
Building progress: From building to...
Building progress: From building to ...
Building progress: ...

- Process installation in parallel with the building

- Low Energy Beam lines installation started end-2012

July 2013: mechanical frame and quadrupoles in place
Building progress: … process installation

- Linac installation just started

July 2013: mechanical frame in place
cryomodules installed soon
Control System Architecture

Channel Access
Control System Architecture

GUIs
Epics tools

Channel Access
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Channel Access
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Equipment control
EDM - CSS/BOY

Channel Access
Control System Architecture

- GUIs
- Epics tools
- GUIs
- Java/Xal

Channel Access

Complex algorithm
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Central services

Channel Access
Control System Architecture

GUIs
- Epics tools

GUIs
- Java/Xal

Central services

Channel Access

IOC : Linux
Control System Architecture

- GUIs
  - Epics tools
- GUIs
  - Java/Xal
- Central services
  - Alarm server, Archiver, Configuration
- Channel Access
  - IOC : Linux
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Central services

IOC : VME

IOC : Linux

Channel Access
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Central
services

Channel Access

IOC : VME
I/O

IOC : Linux
Control System Architecture

- GUIs
  - Epics tools
- GUIs
  - Java/Xal
- Central services
- IOC: VME
  - I/O
- IOC: Linux

Channel Access
Control System Architecture

- **GUIs**
  - Epics tools
  - Java/Xal

- **Central services**

- **IOC**
  - VME
  - Linux

- **Channel Access**
Control System Architecture

- GUIs
- Epics tools
- IOC: Linux
- Channel Access
- GUIs
- Java/Xal
- Central services
- IOC: VME
- I/O
- IOC: Linux
- Modbus/TCP
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Central services

IOC : Linux

IOC : VME

I/O

Modbus/TCP

Channel Access

ADAS I/O cards
Control System Architecture

- **GUIs**
  - Epics tools
- **Epics tools**
  - Java/Xal
- **Central services**
- **Channel Access**
- **Modbus/TCP**
  - IOC : VME
  - I/O
- **IOC : Linux**
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Central services

IOC : Linux
Channel Access

IOC : VME
I/O

Modbus/TCP

IOC : Linux
Control System Architecture

- GUIs
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Channel Access

- IOC: VME
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- IOC: Linux

Modbus/TCP
Control System Architecture

- GUIs
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- GUIs
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Channel Access

IOC : Linux
IOC : VME
I/O

Modbus/TCP

Power supplies
Control System Architecture

GUIs
Epics tools

GUIs
Java/Xal

Central services

IOC : Linux

Channel Access

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I/O

Modbus/TCP

Power supplies
PLCs
Control System Architecture

- GUIs
- Epics tools

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- Java/Xal

- Central services

- IOC: VME
  - I/O
- Modbus/TCP

- IOC: Linux

- Power supplies
- PLCs
- Profilers
Control System Architecture

- GUIs
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- Central services

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- PLCs
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- RF amplifiers
Control System Architecture

- **GUIs**
  - Epics tools
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- **Central services**

- **IOC**: Linux

- **IOC**: VME

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**Modbus/TCP**

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PLCs
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IOC : VME
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Modbus/TCP

Power supplies

PLCs

Profilers

RF amplifiers
Development organization

- Collaboration between IRFU, IPHC and GANIL institutes
- Coordination under responsibility of GANIL
- 3 teams
  - 10 men/year since 2006
- Team working organization
  - Common Spiral2 development platform:
    - EPICS distribution
    - VxWorks kernel
    - Spiral2 version of the EPICS development environment
  - Development shared via SVN repository
  - Rules and Formalization
    - Standardized interface between EPICS records and GUIs
    - Specification template for module documentation
Control System Deliverables

- Development/configuration of 10 central services
  - Examples: RDB for equipment configuration, Alarm management, Archiving ...
- Development of 50 GUIs and tuning applications
  - Examples: Beam profiler visualization, beam optics optimization, analysis of the ion sources output ...
- Configuration of 15 IOCs
- Development of 30 Equipment Interface Modules
  - Examples: EPICS modules for Faraday cups, RF amplifiers, power supplies, Beam profiler
- Development of 10 Drivers
  - Examples: drivers for VME I/O cards, LLRF, BLM ...
Control System Deliverables
Development Status

- Sources/Low energy beam lines validated during tests performed in Grenoble & Saclay in the past 4 years
  - Ions Sources control
  - 3 first IOCs configured
  - Developments required not only for low energy beam lines
    - ✓ Power supply, Faraday cups, Slits, Beam profiler
  - Central Services
  - Commissioning will start mid-2014

- Important developments are still ongoing ...
  - Beam Loss Monitors, Cavity tuning, Vacuum and many others
  - ... must be available end 2014
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Thank you for your attention!