

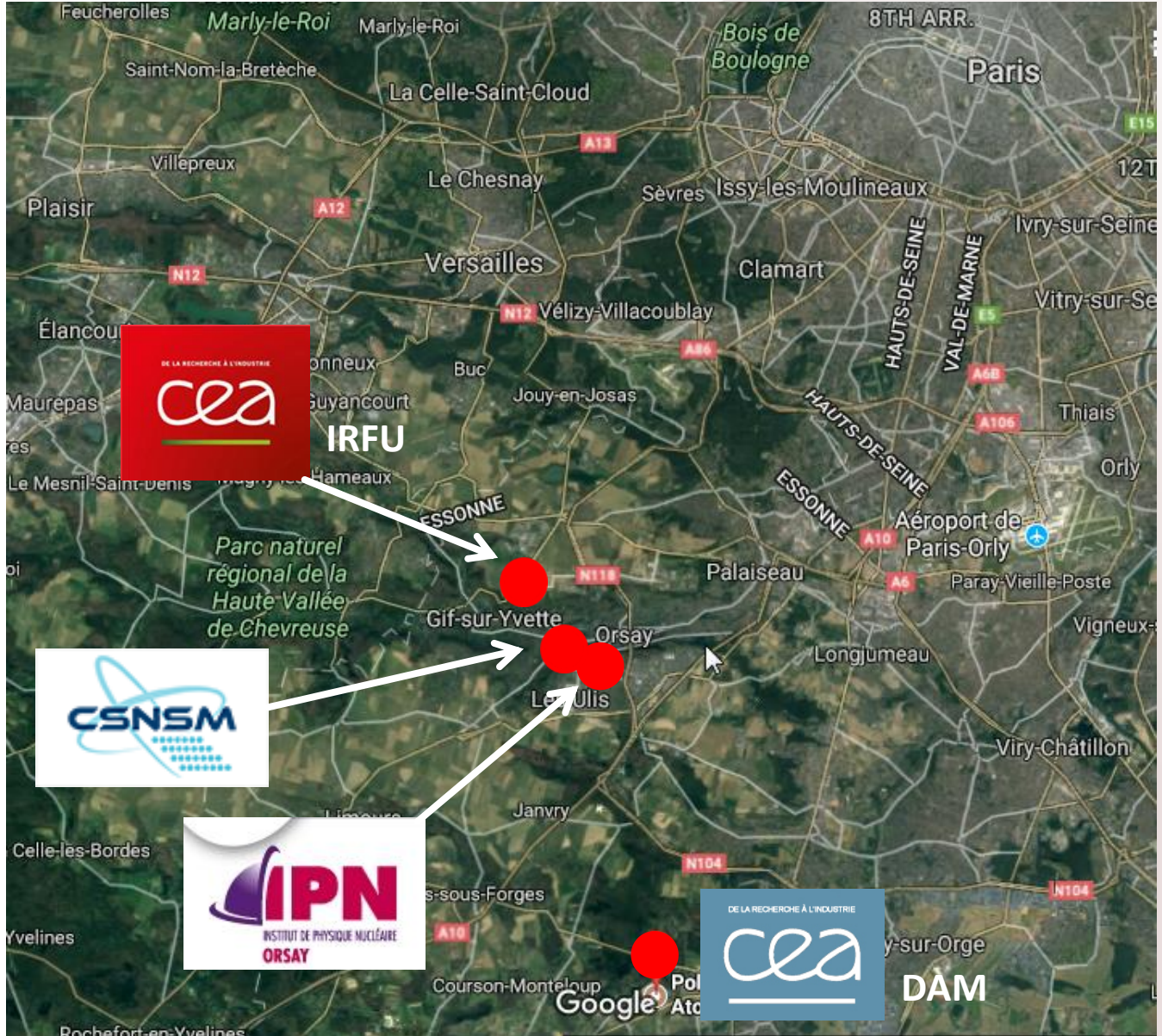
Ge Platform: Initiative to create a center for Ge detector maintenance and R&D

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Ile-de France Nuclear Physics Labs



Existing Ge detector Inventory 2017

- 85 detectors (including LoanPool and GammaPool)

IPNO (52)

CSNSM (8)

CEA/DAM (19)

CEA/IRFU(6)

- Ages range from 2 years to 25 years

- 5- 10 M euro replacement cost

- + AGATA detectors (15 M euro)

- Failure rate estimated at 0.1 – 0.2 per detector/year depending on age

Justification

- **Scientific**: A Ge Platform would be a vital support system for research at the ALTO facility and at CEA/DAM Bruyeres which need many working Ge detectors with which to perform the highest quality research
- **Economic**: The costs of outsourced maintenance are extremely high and the number of broken or partially working detectors in the parc is already unacceptably high (~20%)
- **Political**: Ge platform is in accordance with the recognized need to mutualize resources between laboratories of the Yvette valley with a view to eventual fusion
- **Teaching**: Working Ge's are an essential tool for training in nuclear science
- **Dosimetry**: Vital for diagnostics, background measurements, sample measurements
- **Valorisation**: Development of new experimental techniques and links with industry

HARDWARE RESOURCES AT IPNO

- single-channel analog spectroscopy chain + analysis software (ORTEC MCA + Maestro)
- 2-channel high-voltage power supply (ISEG NHQ 226L)
- 1 digitizing oscilloscope
- 2-channel digital spectroscopy chain (CAEN DT5780, 100 MSPS, 14 bits) (validated with ^{60}Co): oscilloscope, charge spectrum; equipped with high voltage power supplies (two channels) to be validated.
- 1 additional digital spectroscopy chain to be validated
- Pumping/annealing bench (80°C)
- Clean room for FET replacement, including tooling



Possibility to cool 7 detectors simultaneously



Pumping/annealing bench



Tooling in clean room

MANPOWER

- 1 technician (N. Hammoudi, 100 % FTE): diagnostic, maintenance
- 1 engineer (B. Genolini, 15 % FTE): electronics/EMC, instrumentation, data analysis, student recruitment
- Support of the electronics department (G. Brulin)
- Currently setting « standard » internship for students (Master, technician), i.e. establishing a procedure of training
- 1 student, 3-month internship in 2017 (1st-year Masters) – funded by the university of Paris Saclay

**❑ Open permanent position at the IPN Orsay: IR2
Expected 15% FTE on Ge laboratory organisation**

TECHNICAL OPERATIONS

Know-how: maintain coaxial detectors

- Failure diagnostic
- Pumping
- Annealing (80°C)
- FET replacement
- Filter replacement
- Charge preamplifier test and replacement
- Replace ORTEC's obsolete preamplifier by Canberra material

Training / experience

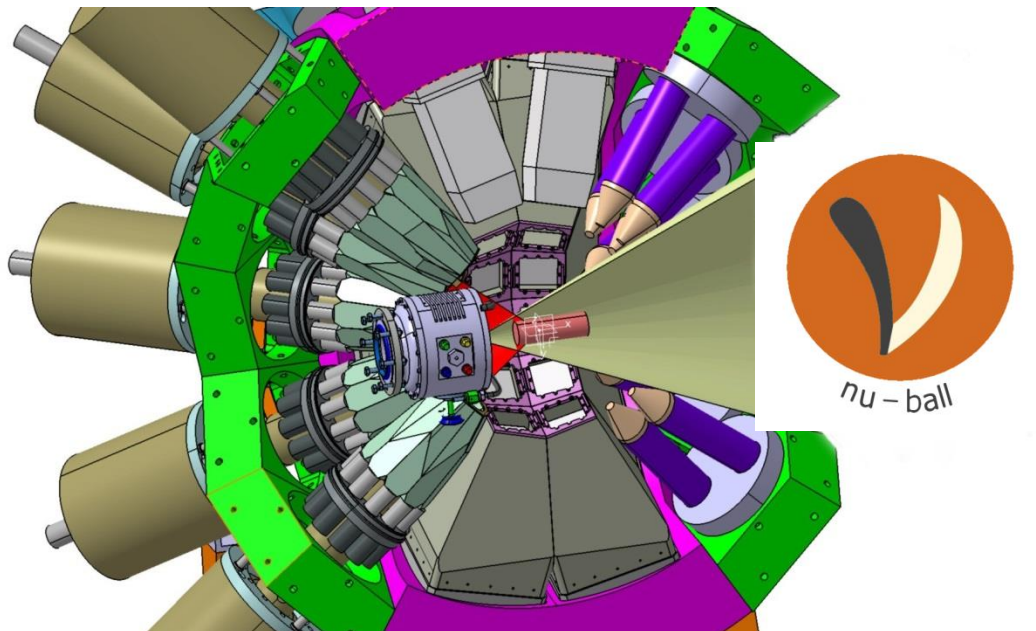
- at Canberra on coaxial detectors (3 days in January 2016) (N. Hammoudi, B. Genolini, G. Brulin)
- with a CAEN engineer on their digitizer (B. Genolini)
- N. Hammoudi:
 - 24-year experience in vacuum and cryogenic technologies
 - 3-year experience in calibration and first-level maintenance on coaxial detectors, with experienced instrumentalists and engineers
- C. De Barbarin: electronics test, soldering, EMC

Tasks to complete

Precise definition required of:

- **The resources needed (equipment, manpower, training etc.)**
- **A clear identification of the partners (future national and international networks?)**
- **The contributions of each partner**
- **An economic or financing model**

Nu-ball status update



- ❑ 4 clover detectors already Shipped from Jyvaskyla

- ❑ Fully tested at IPNO with FASTER Digital DAQ. Resolutions obtained very similar to those obtained in Jyvaskyla

- ❑ FASTER fully digital DAQ 184 channels total. 66 channels delivered. Remaining two crates of cards: delivery expected end of June

- ❑ Mechanical support structure modifications completed
- ❑ Autofill system ready
- ❑ Total ~1600 cables required. Remaining 200 ordered
- ❑ HV from IPNO, Gammapool, Jyvaskyla, GANIL
- ❑ Mounting at beginning of July
- ❑ Cabling and detectors put in frame early september
- ❑ Commissioning October
- ❑ First experiments early November

24 Clover
detectors

Nu-ball status update



Jyvaskyla 28/06/2017
Shipment #2

Cu

90 Rb