DESIR Meeting
Valencia – 27-28 October 2011

Participants: A. Algora, B. Blank, M. Bissel, D. Cano-Ott, S. Grévy, T. Kurtukian-Nieto, E. Liénard, E. Nácher, B. Rubio, J.L. Tain, P. Thirolf, J.C. Thomas, D. Yordanov

Introduction – BB

- New GANIL Direction in January 2011: Florent Staley (CEA) will replace Sydney Gales. Marek Lewitowicz will be Deputy Director.
- The SPIRAL2 week may be a good opportunity to introduce the DESIR collaboration to the new GANIL Director, with or without the representatives of the European collaborators (?). The signature of the DECA prior to the meeting is "DESIRable".

Update on construction program – JCT

- According to the initial construction planning, the preliminary design study was supposed to be done by April 2011, and the detailed design study by October 2011. Following this planning, the construction of the DESIR beam transport tunnel was supposed to start in May 2013 and the DESIR building available for the installation of the experimental equipment by June 2014.
- The preliminary design study is delayed already by 7 months and the prime contractor proposition is rejected by the SPIRAL2 Phase 2 management board because the price estimate for the construction of the production building exceeds by about 15 % the price negotiated in 2010.
- Consequently, some delay is expected for the delivery of the DESIR buildings, unless their construction can start earlier than originally planned with respect to the beginning of the construction of the production building. The funding of the DESIR-EQUIPEX project will be decisive in any case: answer expected by the end of January 2012.

Present "installation" of equipment at DESIR - All

- LUMIERE and Laser room locations? To be optimized with respect to the definitive layout of the LUMIERE setup. Input expected from MB and DY.
- Neutron ditch: do we really need it? If not, one or two ditches will anyway be necessary in order to collect the water used in case a fire starts in the experimental hall. Input expected from DCO. The distance between the large neutron arrays and the walls of the experimental hall may be a matter of optimization. To be kept in mind during the definition of the position of the experimental equipment.
- Relevance of a symmetric fish bone for the beam delivery to the experimental equipment? Depends on the position/organisation of the Equipment.
- Most of the proposed experiments require reasonably purified beams -> PIPERADE to be setup at the beginning of the fish bone, but not on the central line => the feasibility of two distinct beam lines between the GPIB and the beginning of the fish bone has to be investigated (BB).

- Some of the experiments could benefit (mass and BGT measurements) from pure, isotopic and isomeric beams that could be delivered by the CRIS setup of LUMIERE -> the connexion of CRIS to the beginning of the fishbone to be investigated (MB);
- Some of the experiments could benefit from the polarized beams produced at LUMIERE -> information about the experimental equipment to be coupled are required: dimension, time and manpower required to move them, etc. (ALL)
- What about a DESIR dedicated γ-detection array? It should provide a high efficiency, but a high segmentation is not required. To be further discussed together with the possible integration of neutron detectors in such an array (ALL).
- The sharing between MLL Trap and PIPERADE of some of the required supplies (e.g., liquid He filling and recovery systems) should be investigated (BB, SG, PT).

Input needs for construction

- The technical specifications of the MLLTrap setup relevant for the construction will be sent to the equipment coordinator as an example.
- Input needs for all equipment in addition to the technical specifications:
    - Does it require purified beams from PIPERADE?
    - Does it require polarized beams from LUMIERE?
    - Does it require isotopic and isomeric pure beams from the CRIS setup of LUMIERE?
    - Can the setup be "easily" moved from one place to another (man power and time needed)?
    - Gamma detectors needed (efficiency, granularity, combination with plastic detectors, and neutron detectors?)
- Manpower requirement for the maintenance of the experimental setups (e.g., liquid He refill of MLL Trap)?

Input expected from JCT:

- Height below the crane?
- Height of the beam line: can it be higher than 1.5? e.g., 1.75 m would be ideal for the MLLTrap
- Price estimate for a temperature stabilization of ± 1 degree in the DESIR experimental hall?
- Maintained power: how long?

EQUIPEX and beyond

- ~14 M€ asked between mid 2012 and mid 2015 for the construction of the beam transport tunnels and of the DESIR building (7.4 M€), for the construction of the beam lines (5.5 M€) and for the construction of general purpose equipment (GP Ion Buncher + stable ion source, Radioprotection Lab, Mechanical workshop, C&C for the beam line equipment)
- ~1 M€ asked for the running costs from mid 2015 to the end of 2019
- Answer expected by the end of January 2011. Possible plan B to be investigated: smaller experimental hall + only one beam line + no/less general purpose equipment at the beginning, stronger partnership with the BARC Mumbaï for the beam lines, etc.

Safety/Security issues

- Input needed for the characteristics of the neutron sources used for the calibration of the neutron arrays (DCO)
- (Chemical, fire) risks associated with liquid scintillator neutron detectors?

➔ The risks associated with the different experimental equipment should be communicated to JCT, e.g.: extraction of the RIB in air, use of chemicals, of non conventional radioactive sources, etc. (ALL)

Discussion of DECA and future MoU for the construction – B. Blank

- End of SPIRAL2 PP program by February 2011 -> DECA to be issued as a deliverable before and preferably by the end of the year.
- DECA signed by the directors of the French institutes and, for the Foreign partners at least by the scientific coordinators of the experimental equipment to be installed at DESIR. The DECA covers the installation and commissioning of the equipment, not the construction of the infrastructure nor the operation of the equipment.
- Total cost of the experimental equipment: ~5 M€
- Management structure = 3 bodies:
    - Political: 1 vote/member, institute directors
    - Scientific: Collaboration Council
    - Technical: Management board
    - In addition: Collaboration Spokesperson + "DESIR facility coordinator" = GANIL liaison

- Future 1: Consortium agreement between the French partners of the DESIR-EQUIPEX project for the construction, if financing.
- Future 2: MoU for the operation of the facility, with the funding agencies of the partners in the Political body.
  NB: if PIPERADE and part of the LUMIERE systems would be used as general purpose equipment, local crews would be required for the operation -> To be included within the future MoU related to the running of the facility.

News from the DESIR sub-collaborations

- PIPERADE (S. Grévy):
    - Times schedule: 2012 -> end of 2015
    - Objectives: high capacitance (10^6 ions/bunch feeding the purification trap) with a reasonable mass resolution of 10^{-5}
    - Funding: 1200 kE, ANR French funding agency + Région Aquitaine + IN2P3/CNRS + MPIK Heidelberg
    - Collaboration: CENBG (Ion source, RFQ, starting from the SHIRAC 1 prototype or building from scratch a ISCOOL like device, Magnet, equipment supplies and C&C) - CSNSM (simulation of the double Penning trap concept) - LPC (contribution to the design study) - Max Planck Institute (tests of the cleaning of "large samples" with an existing trap) - GANIL (Installation at DESIR)
    - Non permanent manpower: 4x50% PhD + 2 years of Post-Doc (or 3 years of engineer)

- Tests performed in the new assembly hall where both the HRS and PIPERADE will be coupled to a stable ion source before the equipment are moved to SPIRAL2

- LUMIERE
  - M. Bissel: Laser room requirements to be detailed: inputs needed for construction; in principle, only 36 m2 needed at minimum, but 50 m2 should be considered. Part of the laser system could be housed in the experiment hall.
  - M. Bissel: Using CRIS to prepare isotopic and isomeric pure beams to feed other setups via the fishbone
  - D.Yordanov: Optical-pumping line for LUMIERE (NMR like experiment): TRIUMF like setup, 6x5 m2, uses liquid Ne, He, superconducting magnet, two separated beam lines

- MLL Trap infrastructure requirements (P. Thirolf)
  - Fences required around the magnetic equipment
  - At 5 m distance at least from any other magnetic equipment
  - Oil free compressed air
  - N2, He gas bottles next to the setup (1+1)
  - Liquid He recovery system -> towards the SP2 Ph1 liquefactor?

- SHIRAC ongoing developments (E. Liénard)
  - Tests performed with stable Cs^+ ions (3 keV, 120 enA, 4.5 Mhz), up to 90% transmission
  - Only Cs^+ ions extracted although the He buffer gaz is not highly purified
  - Emittance measurement: 5 π.mm.rad, but not clear whether it comes from the RFQ, from the extraction optics or from the measurement itself
  - Future tests: K+, to be done by early 2012, tests with ECR and FEBIAD sources?
  - Comment by Teresa: the emittance has to be quite smaller than 5 π.mm.rad and the beam spot size ~+-0.5x0.5 mm, with a divergence of ~10x10 mrad (2.45 sigma)

- HRS ongoing developments (T. Kurtukian-Nieto)
  - Calculations for the 5^{th} order: expected mass resolution of 1/30000 for a 1 π.mm.rad beam; 1/20000 taking into account the tolerance for the alignment of the different equipments in X and Y. The most sensitive equipment with that respect is the multipole in between the two 90° bending magnets the rods of which need to be aligned to a precision better than 50 µm.
  - Detailed specifications of the magnets by the end of 2011, purchase of the magnets in 2012
  - Manufacturing of other elements at CENBG
  - Installation at CENBG in 2013, tests in 2014
  - Transfer to SPIRAL2 by 2015
  - Maximum Bρ = 0.45 T.m
  - HRS workshop at CENBG the 17^{th} and 18^{th} of November 2011
  - HRS of the S3 low-energy branch = copy of the HRS of the production building

AOB

- Next steps: DECA, technical + safety/security/manpower specifications
- Next meeting during the SPIRAL2 week (23-27th of January 2012)