PHOTON ARRAY FOR STUDIES WITH RADIOACTIVE ON AND STABLE BEAMS

REFERENCE

PARIS collaboration meeting Bormio 2012

Adam Maj





Title: High-energy γ -rays as a probe of hot nuclei and reaction mechanisms

Spokesperson(s) (max. 3 names, laboratory, e-mail - please underline among them one corresponding spokesperson): Adam Maj, IFJ PAN Krakow, Adam.Maj@ifj.edu.pl Aim: Jean-Antoine Scarpaci, IPN Orsay, scarpaci@ipno.in2p3.fr David Jenkins, University of York (UK), dj4@york.ac.uk

GANIL contact person Jean-Pierre Wieleczko, GANIL, wieleczko@ganil.fr

to design and build efficient gamma calorimeter PARIS

PARIS desing concepts:

Design and build high efficiency detector consisting of 2 shells *(or 1 phoswich shell)* for medium resolution spectroscopy and calorimetry of γ-rays in large energy range

Collaboration meetings

Orsay, January 2007
 Krakow, May 2007
 Caen, November 2007
 York, May 2008
 Krakow, October 2009
 Strasbourg, January 2011
 Bormio, February 2012



Collaboration Photo, Krakow, October 2009 PHOTON ARRAY FOR STUDIES WITH RADIOACTIVE ION AND STABLE BEAMS

PARIS Management board

A. Maj - project spokesman; D.G. Jenkins, J.P. Wieleczko, J.A. Scarpaci - deputies

PARIS Advisory Committee

F. Azaiez (F) -chairman, D. Balabanski (BG), W. Catford (UK), D. Chakrabarty (India), Z. Dombradi (H), S. Courtin (F), J. Gerl (D), D. Jenkins (UK) - deputy chairman, S. Leoni (I), A. Maj (PL), I. Matea (F), Ch. Schmidt (F)

Active working groups

- 1. Simulations (O. Stezowski et al.)
- 2. PARIS mechanical design scenarios (S. Courtin, D. Jenkins et al.)
- 3. Physics cases and theory background (Ch. Schmitt et al.)
- 4. Detectors (O. Dorvaux et al.)
- 5. Electronics (P. Bednarczyk et al.)
- 6. PARIS-GASPARD synergy (J.A. Scarpaci et al.)

J. Pouthas – PARIS liaison to SPIRAL2 project management

1. THE PARIS - Collaboration

MAIN PARTNERS

COPIN (Poland)

IFJ PAN Kraków: M. Kmiecik, B. Fornal, J. Grębosz, A. Maj, W. Meczynski, K. Mazurek, S. Myalski, J. Styczen, M. Ziebliński, M. Ciemala, A. Czermak, B. Dulny, B. Sowicki, M. Krzysiek, M. Jastrząb; Warsaw University: M. Kicinska-Habior, J. Srebrny, M. Palacz, P. Napiorkowski, K. Hadynska-Klęk; IPJ Swierk, Otwock: M. Moszynski; UMCS Lublin: K. Pomorski

IN2P3 (France)

IPN Orsay: F. Azaiez, J.A. Scarpaci, S. Franchoo, I. Stefan, I. Matea, G. Hull, B. Genolini, J. Bettanem P. Rossier, J. Pouthas; CSNSM Orsay: G. Georgiev, R. Lozeva; IPN Lyon: O. Stezowski, N. Redon; IPHC Strasbourg: O. Dorvaux, S. Courtin, C. Beck, D. Curien, B. Gall, F. Haas, D. Lebhertz, M. Rousseau, M.-D. Salsac, L. Stuttgé, J. Devin, Ch. Finck, P. Medina, J. Dudek; LPSC Grenoble: Gary Simpson

GANIL (France)

GANIL Caen (France): Ch. Schmitt, J.P. Wieleczko, S. Grevy, A. Chbihi, G. Verde, J. Frankland, M. Ploszajczak, A. Navin, G. De France, M. Lewitowicz, M. Tripon; LPC-ENSI Caen: O. Lopez, E. Vient

BARC/TIFR/VECC (India)

BARC Mumbai: D.R. Chakrabarty, V.M. Datar, S. Kumar, E.T. Mirgule, A. Mitra, P.C. Rout; TIFR Mumbai: I. Mazumdar, V. Nanal, R.G. Pillay, A.K. Gourishetty; VECC Kolkata: S.R. Banerjee, S. Mukhopadhyay, D. Pandit, S. Pal

INFN (Italy)

INFN Milano: S Brambilla, F. Camera, S. Leoni, O. Wieland; INFN-LNS, Catania: D. Santonocito; LNL Legnaro: F. Gramegna, G. de Angelis, J.J. Valiente-Dobon; INFN Napoli: D. Pierroutsakou

University of York (UK)

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HH-IFIN, Bucharest: F. Negoita, M. Stanoiu

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<u>Bulgaria</u>

INRNE, Bulgarian Academy of Sciences, Sofia: D. Balabanski; University of Sofia: S. Lalkovski, K. Gladnishki, P. Detistov

ASSOCIATED PARTNERS

ATOMKI Debrecen (Hungary): Z. Dombradi, D. Sohler, A. Krasznahorkay, G. Kalinka, J.Gal, J.Molnar University of Surrey, Guildford (UK): Z. Podolyak, P.R. Regan, S. Pietri, P. Stevenson, W. Catford

COLLABORATING PARTNERS

STFC Daresbury (UK): J. SImpson, J. Strachan, A. Smith, M. Labiche Nuclear Physics Group, The University of Manchester (UK): A. Smith GSI Darmstadt (Germany): P. Bednarczyk, M. Górska, J. Gerl, H. Geissel Flerov Laboratory of Nuclear Reactions, JINR, Dubna, Russia: Y.E. Pienionzhkevich, A. Fomichev, S. Krupko, V. Gorshkov RIKEN Tokyo (JP): P. Doomenbal Institute of Nuclear Physics, NCSR "Demokritos", Athens (Greece): S. Harissopulos, A. Lagoyannis, T. Konstantinopoulos University of Edinburgh (UK): D. Watts University of Oslo (Norway): S. Siem DSM/Dapnia CEA Saclay (France): C. Simenel NBI Copenhagen (Denmark): B. Herskind, G. Sletten HMI Berlin (Germany): H.J. Krappe LBNL, Berkeley, CA (US): M.-A. Deleplanque, F. Stephens, I-Y. Lee, P. Fallon IThemba LABS (RSA): R. Bark, P. Papka, Jakobus Lawrie Uppsala University, Uppsala (Sweden): Henryk Mach KVI, Groningen (The Netherlands): M. Harakeh

Several geometries studied





PARIS phases and cost estimates

Phase 1 2011/2012 PARIS Prototype	1 cluster: 9 phoswiches		250 k€	Decided Funds: SP2PP, ANR, Orsay, Strasbourg, Kraków, Mumbai Tests in-beam and with sources
Phase 2 2015 PARIS Demonstrator	4-5 clusters: 36-45 phoswiches		≈1 M€	Only if Phase1 validated Funds: MoU Ph1Day1 exp@S3
Phase 3 2017 PARIS 2π	12 clusters: 108 phoswiches		≈ 2 M€	Only if Phase2 validated Funds: MoU, PARIS consortium Ph2Day1 exp. with AGATA and GASPARD Other exp.
<i>Phase 4</i> ≈2019 PARIS 4π	≥24 clusters: ≥216 phoswiches		≈ 4 M€	Only if Phase3 validated Funds: PARIS consortium Regular experiments in various labs

Indicated costs are approximations only. Include cost of LaBr3+NaI phoswiches, PMs, HV, electronics and mechanics. It is assumed that phoswich solution will work.

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January-December 2011: 9 phoswiches for the PARIS prototype (PHASE1: cluster 3x3) are purchased from Saint Gobain): 2 France, 3 Poland, 4 India. They were individually tested with sources and inbeam in Strasbourg, Orsay, Krakow and Mumbai. PARIS prototype almost ready

January 2012: **MoU on PARIS Demonstrator** 4-5 clusters ready

Table B.3.1 Summary table of the capital investment, personal resources for PARIS system and the planned sharing between the participating collaborating institutions of each country, Table includes the funds committed for the PARIS prototype and the funds planed or intentional until 2015 for the demonstrator phase.

Funds committed (before December 2011) (k€)	Personal resources already committed before December 2011	Planned (2012-2015) new capital investment (k€)	Planned (2012- 1015) Personal resources (person-month)	Total capital investment (k€)	Total personal resources (person- month)
50	(person-month)			50	
50				50	
			12		12
40	36	260	94	300	130
	29	180	22	180	51
20	20	270	100	200	120
30	30	270	100	300	130
80	6	100	44	180	50
	11		9		20
	5	15	15	15	17
		50	6	50	6
		20	48	20	48
		70	24	70	24
200	117	965	371	1165	488
	Funds committed (before December 2011) (k€) 50 40 30 80 80 200	Funds committed (before 2011) (k€)Personal resources already committed before 2011 (person-month)501403640363030806115200117	Funds committed (before December 2011) ($k \in$)Personal resources already committed before December 2011 (person-month)Planned (2012-2015) new capital investment ($k \in$)50 2011 (person-month) 260 403626029180303027080610011 50 200117965	Funds committed (before 2011) $(k \in)$ Personal resources already committed before 2011 (person-month)Planned (2012-2015) new capital investment $(k \in)$ Planned (2012- 1015) Personal resources (person-month)50112403626094403626094291802230302701008061004411915155015156200117965371	Funds committed (before 2011) $(k \in)$ Personal resources already committed before 2011 (person-month)Planned (2012-2015) new capital investment $(k \in)$ Planned (2012- 1015) Personal resources (person-month)Total capital investment $(k \in)$ 50 12 1015 100 $(k \in)$ 50 12 12 $(k \in)$ 40 36 260 94 300 40 36 260 94 300 30 30 270 100 300 30 6 100 44 180 11 9 11 15 15 11 20 48 20 200 117 965 371 1165

On 16th of January the first 5 partners (IN2P3, COPIN, GANIL, IFIN-HH and Turkey) signed the MoU what means that the MoU is effective. The signatures from other partners are expected soon.



Next steps

Detector tests:

- Assembling the first cluster (IPN Orsay)
- Testing the cluster with sources and in-beam (Orsay, Krakow, Debrecen?, ...)
- Using cluster in real experiments (ALTO, GANIL, LNL Legnaro, Krakow, Warsaw, Jyvaskyla?...)

New PARIS Steering Committee will be formed from delegates of each MoU partner

- The tasks of the Steering Committee are as follows:
- Define the scientific policy of the *PARIS* Collaboration taking advice from the *PARIS* Collaboration Council.
- Elect a chair and vice-chair among its members who will each serve for a period of two years.
- Appoint a project manager and members of the *PARIS* Management Board. Monitor the Project based on reports received from the Project Manager.
- Decide on any modification of the Project proposed by the Project Manager.
- Decide on the experiment campaigns for *PARIS* and the timetable.
- Appoint the Campaign Spokesperson for each experiment campaign.
- Review the scientific progress of each experimental campaign based on reports received from the Campaign Spokesperson.
- Review the running cost statements and allocations
- Decisions in the *PARIS* Steering Committee shall be taken by consensus

AGENDA of PARIS collaboration meeting Bormio, Tuesday, 21 February 2012

9:15-10:00 <u>Simulation WG</u> : Oliver Stezowski (Lyon) – "Simulations: status and perspectives?
Marc Labiche - "What gamma-ray array for GASPARD ?"
Mateusz Krzysiek (Kraków) – "Simulations of Possible Application of RFD in Nuclear Structure's Studies with Radioactive Beams"
10:00- 10:30 Detector WG : Oliver Dorvaux (Strasbourg) - overview
Mirek Zieblinski (Krakow) – Phoswich tests in Krakow
Vandana Nanal (Mumbai)– Testing the CeBr3 detectors
10:30-11:00 Coffee with cakes
11:00 – 12:00 <u>Electronics WG</u> : Piotr Bednarczyk – overview
Marc Rousseau (Strasbourg) – "Electronic development for Phoswich at IPHC"
Sergio Brambila (Milano) – "Milano test setup for Paris phoswich detectors"
Marcin Jastrzab (Krakow) - "The Phoswich detector and concept of its readout electronics for Paris"
Gilles de France (GANIL) – "Status of the EXOGAM2 electronics"
12:00-12:20 <u>Mechanics WG:</u> David Jenkins - overview
Iolanda Matea- Cluster mechanics
12:30 – 14:00 Lunch break
14:00 – 15:30 <u>Physics Case WG</u> : Christel Schmitt – overview
Indranil Mazumdar (Mumbai) – "Beams and sites for testing PARIS"
Faical Azaiez (Orsay) - Day1Phase1 LoI: PARIS@S3
Abdou Chbihi (GANIL) – "Exploring exotic excited nuclei decay modes with correlation measurements at S3"
Silvia Leoni (Milano) – "Collective modes of excitations in the neutron rich Ba region via fusion-evaporation reactions:
Krzysztof Pomorski (Lublin) – "MacLaurin, Jacobi and Poincare shape transitions in rotating nuclei within Strutinsky optimal shape theory
15:30-16:00 Light Coffee
16:00 – 17:00 Presentation of the PARIS main partners :(Conv: Faical Azaiez)
Iolanda Matea – France (IN2P3)
Adam Maj – Poland
Christell Schmitt – France (GANIL)
Vandana Nanal – India
Angela Bracco – Italy
Dimiter Balabanski – Bulgaria
David Jenkins - UK
Mihai Stanoiu- Romania
17:00 – 18:00 General Discussion (conv. Adam Maj)

18:00 - 19:30 (Closed meeting)
Discussion on future of PARIS collaboration (conv. Faical Azaiez & Adam Maj)
1 or 2 representatives from each PARIS MoU partner, by invitation