PARIS Status

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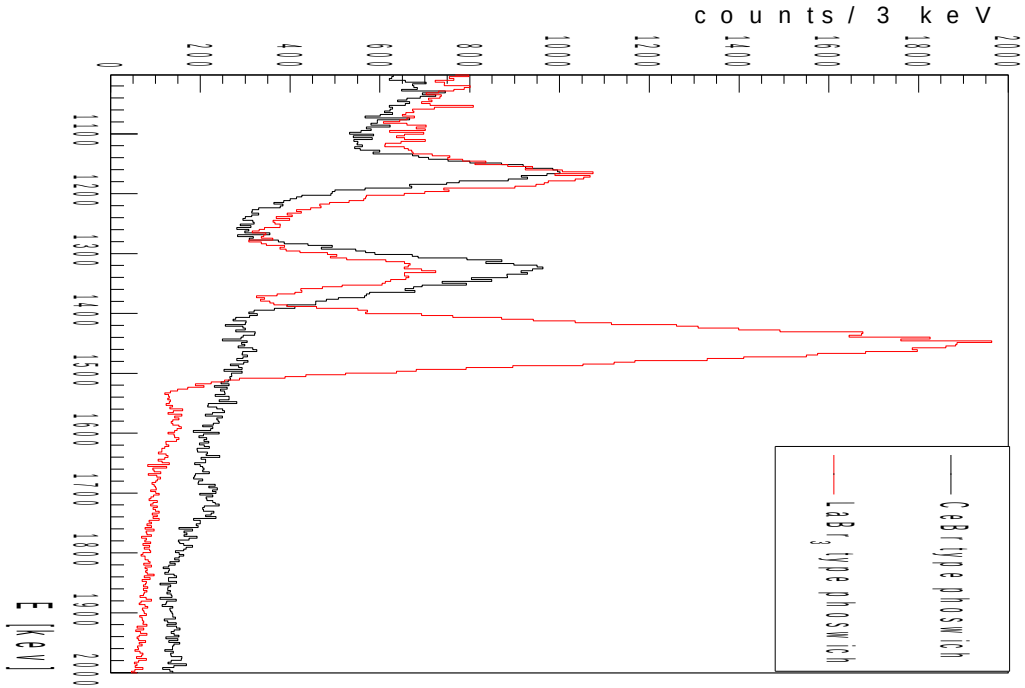
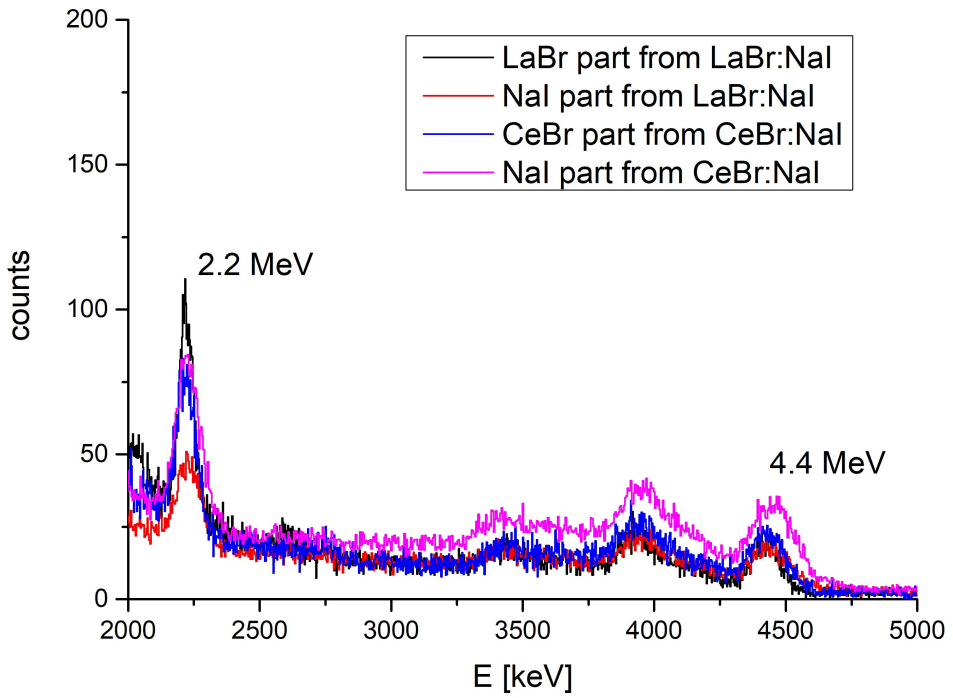
1. Detectors, LaBr3 vs. CeBr3 phoswiches
2. Electronics
3. Detector tests performermed
4. Experiments performed, accepted and planned:
    a) GANIL
    b) IPN Orsay
    c) IFJ PAN Krakow
5. Other possible experiments
6. Publications, Master thesis, Ph.D. Thesis
7. GANIL User Group - possible representation of the PARIS collaboration (ML+AM)

Detectors, LaBr3 vs. CeBr3 phoswiches

Becasue of the problems with production by SaintGobain of the LaBr3_NaI phoswiches, PSC agreed to go in paralel for the alternative solutions: CeBr3_NaI phoswiches from SCIONIX
I meant time SaintGobain solved the problems by inserting a glass window between LaB3 and NaI.





Both types of phoswiches give similar quality of data and work as expected

Status of PARIS detectors

Partner	2012-2017	
	$LaBr_3$_NaI	$CeBr_3$_NaI
FRANCE–IN2P3	10	
FRANCE-GANIL	2	1
POLAND	6	4
INDIA	4	4
UK	2	
ITALY	2	
TURKEY	1	
ROMANIA		4
DUBNA		
Total	**27**	**13**

(Few older LaBr3_NaI phoswiches will go back to SG)

Presently PARIS possessess **4 clusters**:

3 LABr3 type, 1 CeBr3 typs

Electronics

1) NUMEXO2 - a general-purpose digital card for GANIL based experiments (collaboration with EXOGAM2 and NEDA projects)

Implementation of the GTS interface into the NUMEXO2 VIRTEX 5 FPGA is currently being finalized.

A dedicated PARIS FADS front end electronics (mezzanine) is being designed. The digitizer will be integrated with the NUMEXO2 carrier board. Implementation of algorithms for on line PSA on the FPGA Virtex6LX platform is in progress.

2) **Analogue electronics** based on **Milano "PARIS_Pro"** cards (S. Brambilla et al.) + **AGAVA** interface (A. Czermak et al..):
Already tested in AGATA LNL and GSU camapigns!
Used for first experiments with AGATA (integrated to the VAMOS branch)

3) Comercial digitizers (V1730, 16 channel, 500 MS/s, 12/14 bit CAEN digitizer)

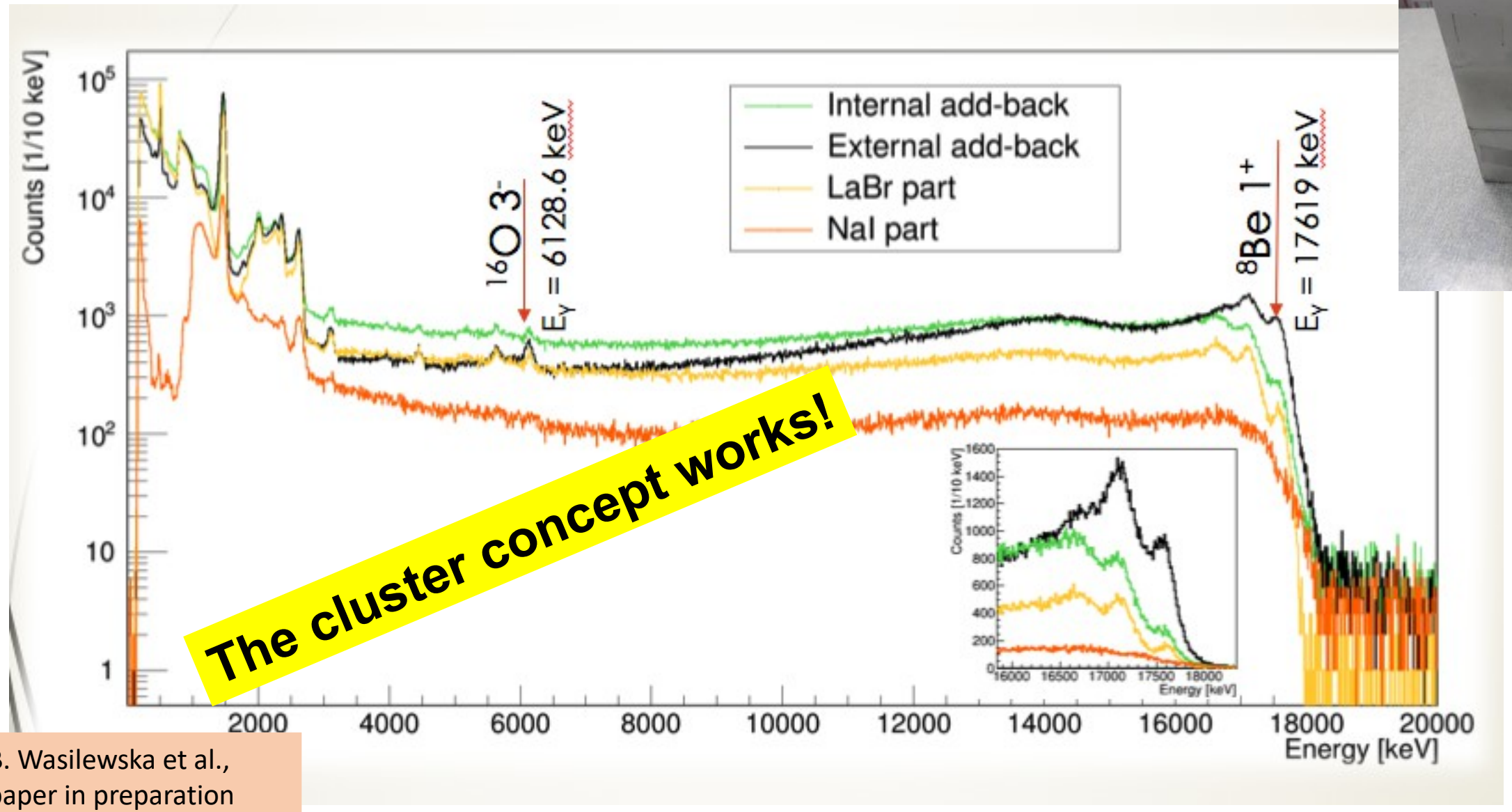
Tested in Krakow, July 2015 – works very well (good time reolutin, time resolition – 0.7ns, low deadtime)

4) Occasionally other local digitizers (e.g. FASTER in IPN Orsay)

Detector tests performermed

Cluster tests were performed in
IPHC Strasbourg, IPN Orsay, IFJ PAN Krakow, TIFR Mumbai,
ELBE Rosendorf, INFN Milano, ATOMKI Debrecen
using sources and beams

Exp. in ATOMKI Debrecen – March 2017
(p,gamma) – reaction on LiBO target



B. Wasilewska et al.,
paper in preparation

Experiments performed, accepted and planned

GANIL

PARIS coupled to AGATA@GANIL

3 proposals accepted by the GANIL PAC

- S. Leoni, B. Fornal, M. Ciemala et al., Lifetimes in A=18 region measured with PARIS (2 clusters + 2 large LaBr3), *AGATA, VAMOS, Plunger*
  (DONE! 11-23 July 2017)
- P. Bednarczyk, A. Maj et al.**,** Investigation of a high spin structure in 44Ti via discrete and continuumγ-spectroscopy with *AGATA, PARIS* (4 clusters) and *DIAMANT*
- B. Fornal, S. Leoni, M. Ciemala et al., „Gamma decay from near-threshold states in 14C: a probe of clusterization phenomena in open quantum systems", AGATA (4 clusters) , PARIS, NEDA, DIAMAND, DSSD

Lol and proposal for PARIS with LISE@GANIL

(Not accepted this time. Will be repeated)

- Y. Blumenfeld, A. Maj et al., „**Study of giant and pygmy resonances in exotic nuclei at LISE",** ACTAR TPC, Chateau de Cristall, CATS, PARIS, large LaBr3

ALTO at IPN Orsay

Performed:

- I. Matea, J. Wilson, M. Ciemala et al. „PARIS cluster response to fast neutrons”
- A. Kozulin, I. Harca et al. “Prompt γ-rays as a probe of nucleardynamics”
- M. Lebois, Q. Liqiang et al. “Prompt gamma and neutron emission for 238U fast neutron induced fission as a function of incident neutron energy”

Accepted:

- B. Blank et al., „Measurement of the super-allowed branching ratio of 10C” (???)
- M. Wiedeking et al. ,,Colomb excitation of 14C” (???)
- P.J. Napiorkowski et al., „Coulomb excitation of super-deformed band in 40Ca”
- M. Kmiecik, F. Crespi, J. Wilson et al., „Feeding of low-energy structures in 188Pt of different deformations by the GDR decay: the nuBall array coupled to PARIS” (probably June 2018)

Presently new call fo proposals

CCB at IFJ PAN Krakow

Partly performed:

- M. Kmiecik, F. Crespi, B. Wasilewska et al. „Studies of resonance states in nuclei using high-energy proton beam in p,p’ reactions at forward angles with HECTOR, PARIS, KRATTA”

Accepted:

- S. Leoni, B. Fornal, N. Cieplicka et al., „Study of M4 resonance decay in 13C”
- A. Bracco, B. Fornal „Investigations of (p,2p) reactions in order to identify deep single-particle proton-hole states”: HECTOR, PARIS, KRATTA
- Ch. Schmitt, D. Mancusi, B. Kamys et al., „Investigation of proton induced spallation with HECTOR, PARIS, KRATTA”

New call for proposals: July 2018

PARIS@SPES/LNL Legnaro (preliminary LoIs)

- **GDR decay of hot rotating nuclei in A=130 mass region** (Maj, Leoni): GALLILEO, RFD
- M**easurement of Isospin Mixing in N=Z medium mass nuclei** (F. Camera): HECTOR+, GALLILEO
- **Measurement of the Dynamical Dipole emission** and the symmetry term of the EOS (F. Camera, G. Casini): HECTOR+, fusion_evaporation det**.**
- **Entry distributions for fragments produced in deep- inelastic collisions** with stable and radioactive beams (Królas)
- **Heavy-ion binary reactions** as a tool for detailed gamma spectroscopy in exotic regions (Leoni, Maj): PRISMA, GALILEO
- **High-spin gamma ray spectroscopy of heavy, octupole deformed Ac and Fr** nuclei produced in fusion evaporation reactions with the intense A∼90 Rb radioactive beams at SPES (Bednarczyk): GALILEO
- **GDR feeding od the SD bands in A=30-60 region** (P. Bednarczyk, M. Kmiecik, F. Camera)

Publications, Master thesis, Ph.D. Thesis

- A. Maj et al., The Paris Project, Acta Physica Polonica B 40 (2009) 565,
- C. Ghosh, V. Nanal, :Characterization of PARIS LaBr3(Ce)-NaI(Tl) phoswich detectors up to Egamma~22 MeV," Journal of Instrumentation 11 (2016)
- B. Wasilewska, M. Kmiecik, A. Maj et al., „The First Results from Studies of Gamma Decay of Proton-induced Excitations at the CCB Facility:, Acta Phys. Pol. B48, 635 (2017)
- B. Dey, C Ghosh, S Pal, V Nanal, RG Pillay, KV Anoop, MS Pose, „Neutron response of PARIS phoswich detector", arXiv:1708.06346, to appear in Advanced detectors for Nuclear, High energy and Astroparticle physics (Springer Nature Singapore Pvt Ltd, 2018)
- Q. Liqiang et al. (exp, in Orsay), submited,
- I. Harca et al. (exp. In Orsay), in final stage of preparation
- B. Wasilewska (ELBE treests), in final stage of prepraration
- B. Wasilewska et al., (ATOMKI tests), to be prepared
- M. Ciemala, I. Matea, J. Wilson (test of PARIS at Licorne), in preparation

Ph.D's:

- C. Ghosh (2017), TIFR
- A.Mentana (2018), Milano, delivered
- B. Wasilewska, PhD Krakow, 2018, soon
- Q. Liqiang (2018?) IPN Orsay

NEW USERS ORGANIZATION

- GANIL User Group (better name?) – all GANIL users who declare to be in (email, web page, …)

- GANIL User Group will be represented by the elected GANIL User Executive Committee (GUEC?) and Chairperson of GUEC

- Role of the of the GUEC:
  - assisting the GANIL Management in developing an ambitious scientific program of GANIL (inputs for developments of infrastructure, detectors, operation, long-range planning,…)
  - Chairperson of the GUEC – ex-officio member of GSC, will confer on regular basis with chairperson of PAC and chairperson of GSC,..,
  - organizing annual meetings of the GANIL User Group
  - coordination of the editorial board of the GANIL Annual Report
  - …..

FORMATION of GUEC

The GANIL User Executive Committee will be formed by 7 representatives of the GANIL User Group, related to the following topics relevant for GANIL:
a. Nuclear Physics (Theory, Nuclear Astrophysics, Experimental nuclear structure, Nuclear dynamics from low to medium energy, Fundamental interaction studies Applications and Nuclear Data;
b. GANIL Infrastructures (experimental halls and magnetic spectrometers): S3, NFS, DESIR, LISE, VAMOS, EXOGAM …
c. Equipment used at GANIL (mainly traveling detectors): ACTAR, AGATA, FAZIA-INDRA, NEDA, PARIS, …
d. Atomic Physics/material Science and non-nuclear physics topics

3 members representing the Nuclear Physics in GANIL (topic 4a) will be elected by all the members of the GANIL User Group.
1 member will be elected by the collaborations around GANIL infrastructures (topic 4 b)
1 member will be elected by the collaborations around travelling detectors (topic 4c).
1 member representing collaborations around atomic and material science and non-nuclear physics (topic 4d) will be nominatred by Director of CIMP

1 member, the liaison member of GANIL, will be nominated by the Director of GANIL, acting as the Secretary of the committee, and facilitate communication between the Committee

- The term of GANIL User Executive Committee will be 4 years
- The Chairperson of the Committee will be elected by the Executive Committee at the first meeting from the committee members for4 years term
- The newly elected GANIL User Executive Committee will prepare the Terms of Reference defining precisely the role and organization of the GANIL User Group

Please register at the
GANIL community portal

https://u.ganil-spiral2.eu/portal/register/