The phoswich concept detector for the PARIS photon calorimeter

O.Dorvaux, S. Kihel – IPHC Strasbourg;
P. Bednarczyk, M. Ciemała, M. Kmiecik, B. Fornal, K. Mazurek, B. Wasilewska, M.Krzysiek, M.Zieblinski, M.Jastrzab, A. Czermak – IFJ PAN Krakow;
F.Azaiez, I.Matea – IPN Orsay;
M. Lewitowicz, Ch. Schmitt – GANIL;
O. Stezowski –IPN Lyon;
A.Bracco, S.Leoni, F.Camera, S.Brambilla, B.Million, O.Wieland, A. Giaz – INFN & U. Milano;
V.Nanal, I.Mazumdar – TIFR Mumbai;
D. Jenkins – University of York;
P. Napiorkowski - HIL Warsaw;

The PARIS collaboration gathers a widespread community of physicists, the project being devoted to studies on both nuclear structure and reaction dynamics. In particular, exotic collective phenomena (including giant resonances and rapid shape transitions), discrete gamma as well as reaction dynamics are planned to be investigated with the future PARIS calorimeter array (Photon Array for studies with Radioactive Ion and Stable beams). To contend with the variety of physics cases, the PARIS array can be used as a sum-energy detector (i.e. a calorimeter) and/or a multiplicity filter of high resolution.
To fulfill the needed requirements, PARIS makes use of most advanced scintillator technology. The basic element of the array is a phoswich cell, consisting of a 2″x2″x2″ LaBr3 crystal optically glued on a 2″x2″x6″ NaI(Tl) crystal. Both crystals are mounted in an Aluminium can under vacuum. The readout of the phoswich ensemble is made on the NaI(Tl) side with Hamamatsu photomultiplier tube coupled. Individual phoswich cells have been intensively tested by the collaboration, at various laboratories, both off- and in- beam.
This presentation will detail off-beam characteristics, in terms of time and energy resolutions, obtained using standard photon sources and in-beam conditions giving access to high gamma energy. Then the presentation will be focused on some preliminary results from experminents at thr ALTO facility.