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Development of a novel geometrical concept of a high

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The concept was proposed as a competitive and innovative approach, mainly for a high resolution brain PET scanner, allowing a parallax free 3D image reconstruction with Compton enhanced sensitivity. It is based on axially oriented matrices of 16 x 13 long polished LYSO scintillator bars (e.g. 3.2 x 3.2 x 150 mm³) optically coupled at both extremities to segmented Hybrid Photon Detectors (HPD) readout by mean of a VLSI auto-triggering fast Front End Electronic (FEE) encapsulated in the detector body.

The status of the development program will be discussed after an introduction in order to recall the basic principles of the concept and the subsequent requirements to the readout system. The progress on the characterization of the crystal bars, a key component of the project, will be presented in a separated contribution.

The design of the HPDs and of the FE readout electronic will be described and the performances obtained with a prototype PET-HPD reported.

Finally, the design of an Event Driven Read-out System under development will be presented.

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