SEMINAIRE DE PHYSIQUE CORPUSCULAIRE

SUJET :   **The AX-PET experiment : A demonstrator for an axial Positron Emission Tomography**

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LIEU: **Science II, Auditoire 1S081**
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RESUME:

PET (Positron Emission Tomography) is a tool for in-vivo functional imaging, successfully used since the earliest days of nuclear medicine. It is based on the detection of the two coincident 511 keV photons from the annihilation of a positron, emitted from a radiotracer injected into the body. Tomographic analysis of the coincidence data allows for a 3D reconstructed image of the source distribution.

The AX-PET experiment proposes a novel geometrical approach for a PET scanner, in which long scintillator crystals (LYSO) are placed axially in the tomograph, and are individually readout by G-APD's, Geiger- mode Avalanche Photo Diodes, also known as Silicon Photomultipliers. Arrays of WLS strips, also individually readout by G-APD's, are placed behind each layer of crystals, to measure the axial coordinate of the photon interaction point.

Two AX-PET modules have been built at CERN, and fully characterized with point-like Na-22 sources, demonstrating competitive performance in term of spatial and energy resolutions (respectively: $R\_FWHM \sim 1.35$ mm in the axial direction; $(\Delta E/E)\_FWHM \sim 12\%$ at 511 keV). Used in coincidence, the two modules represent the demonstrator for a PET prototype. The demonstrator has been used for the reconstruction of images of several phantoms filled with F-18 based radiotracers. The AX- PET detector, its performance and the reconstructed images of different phantoms will be shown.

Since recently, digital Silicon Photomultipliers (dSiPM) from Philips are being investigated as alternative photodetectors for the AX-PET. With their highly integrated readout electronics and excellent intrinsic time resolution, dSiPM's may allow for compact detector modules with Time of Flight capability (TOF-PET). Results about the first tests with dSiPM will also be reported.

INFORMATION : http://dpnc.unige.ch/seminaire/annonce.html
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