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ClearPET, a high performance small animal PET scanner

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The ClearPET is a high performance small animal PET scanner that has been developed within the Crystal Clear Collaboration (CCC) and is now commercially available to customers worldwide through the Raytest group (<http://www.raytest.com>).

Its high sensitivity and spatial resolution are achieved thanks to a patented phoswich configuration made of two types of scintillating crystals: L(Y)SO and LuYAP:Ce, thus providing Depth-of-interaction (DOI) information. In the commercial version 8x8 phoswich units, each one composed of one L(Y)SO crystal coupled to one LuYAP (both of dimensions 2x2x10 mm³), are glued to multichannel Photomultiplier tubes (Hamamatsu R7600). A unit of four PMTs arranged in-line represents one of 20 sectors of the ring design and is designed as a "cassette". The gantry on which the 20 cassettes are fixed allows for rotation of the detector modules around the field of view. Free-running ADCs digitize the PMT pulses and later digital data processing determines the gamma energy, the phoswich layer (DOI) and the exact pulse starting time, which is subsequently used for coincidence detection. The opening diameter of the ring can be adjusted to 140 or 260 mm. In the first case, the animal port is 125 mm, what is appropriate for whole body rodent studies whereas the second case allows for an animal port of 245 mm suitable for primate brain studies. The field of view axial length is 110 mm.

In order to illustrate the performances of the commercial ClearPET, the first results obtained (spatial resolution, sensitivity, count rates and phantoms images) will be presented in this poster as well as the updated situation of the first commercial unit sold to the Animage platform in Lyon.

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