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Screen 08 - ScintoTube: An Edgeless preclinical PET insert

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Positron Emission Tomography (PET) research in the small animal (pre-clinical) field is driven by improving spatial resolution and sensitivity. Conventional PET scanners are built of multiple detector modules placed in a cylindrical geometry. The unavoidable gaps between the detector modules decrease sensitivity and degrade spatial resolution towards the edges of the system field of view (FOV). To mitigate the modular design associated problems, it has been proposed to design edge-less scanners. Following this idea, we already designed and validated an edgeless pre-clinical PET insert based on a single LYSO annulus with a cylindrical inner diameter but 10 outer facets. The system provided good performance but some undesirable effects were observed in the light distribution (LD) pattern in the annulus joints. To account for this, we have modified the design and already built a new version of this edgeless scanner in which both outer and inner facer are cylindrical. We present here the preliminary evaluation of the system performance to demonstrated that we have solved the problems encountered in the first design.

Primary authors: FREIRE, Marta (Institute for Instrumentation in Molecular Imaging (i3m)); Mrs GONZALEZ-MONTORO, Andrea (i3m); Mr CAÑIZARES, Gabriel (i3m); Mrs VALLADARES, Celia (i3m); Mr BERR, Stuart S. (University of Virginia); Mr WILLIAMS, Mark B. (University of Virginia); Mr CORRECHER, Carlos (Bruker); GONZALEZ, Antonio (Institute for Instrumentation in Molecular Imaging, i3M-CSIC)

Presenter: FREIRE, Marta (Institute for Instrumentation in Molecular Imaging (i3m))

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