Contribution ID: **225** Type: **Poster presentation + pitch**

The Annular Anode Gas Proportional Scintillation Counter

Gas Proportional Scintillation Counters (GPSC) exploit the photon emission from the de-excitation of noble gas atoms as a detection mechanism. The size of the detector radiation window relative to the photosensor active area has always been a limitation in this type of detectors, since the amount of light collected by the photosensor may vary according to the axial distance of the incident x-ray interaction due to solid angle effects. An annular geometry for the detector anode defines a scintillation region for which the solid angle subtended by the photosensor remains constant, independent from the radiation interaction position, thus enabling to obtain a GPSC design with a large radiation window. Along with this advantage, the simplicity and robustness of this novel geometry could provide a step forward into the design of a portable GPSC, coupled to low power electronics, e.g. using SiPM or Large Area APDs instead of PMTs. We report on the simulation studies of the electric field in the detector volume for several parameters, like anode diameter, shape and applied voltage in order to maximize the annular anode GPSC detection efficiency. Simulation results also show the expected scintillation yield and energy resolution for 5.9 keV x-rays. Preliminary experimental studies for 5.9 keV x-rays are presented for an annular anode GPSC with a radiation window area of 50 cm^2 and a photosensor sensitive area of 18 cm^2. This type of portable, room-temperature detector, with large-detection-area and/ large-detection-volume can be an interesting choice for x-ray astronomy, competing with solid-state detectors.

Primary author: Mr SILVA, Pedro (Libphys-uc)

Co-authors: Dr FERNANDES, Luis (LIBPhys, Physics Department, University of Coimbra, Rua Larga, Coimbra, 3004-516, Portugal); Dr MONTEIRO, Cristina (LIBPhys - University of Coimbra)

Presenter: Mr SILVA, Pedro (Libphys-uc)

Session Classification: Poster session 2

Track Classification: Sensor Materials, Device Processing & Technologies