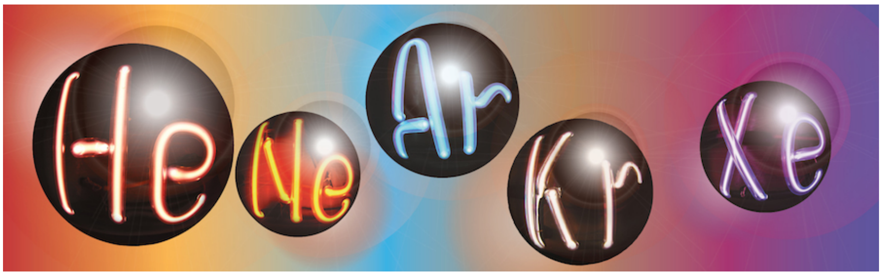

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Study of hole-geometry impact in the light yield using thick electroluminescence-based MPGDs

In this work we report a recently developed simulation framework to model the full detection process from radiation/particle primary interaction with a given gas medium to charge transport (drift and diffusion), light production (primary and secondary photon emission), conversion (wavelength-shifting) and propagation and detection in a suitable photosensor. This simulation framework was developed with the ultimate goal of performing studies on MPGD-based optical amplification structures of potential interest to rare-event searches.

To validate the simulation framework, a systematic characterization of light production and energy resolution in novel MPGD-based optical amplification structures with and without wavelength-shifting capabilities (FAT-GEMs) and focused on different hole geometries, was performed. The preliminary results on the performance of these structures in Xe-doped Ar will be presented, including the effect of conical holes (and different geometric configurations) on light production and the fraction of converted light reaching the photosensors, used to validate this tool.

The validated simulation framework will enable future studies on the impact of different materials (electrodes, bulk media, wavelength shifters) and geometric parameters (hole pattern, pitch, size, and shape) in the performance of optical amplification structures This tool will be an invaluable component in the R&D of novel optical amplification concepts and detector designs.

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