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Advances on MagLITE photo-collection efficiency

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Photodetection systems in liquid noble element experiments often utilize external wavelength shifter films deposited over optical elements; however, this method is susceptible to issues such as loss of efficiency, cross-contamination, and mechanical and chemical stress. Our research group has developed MagLITE (Magnesium fluoride Light collection Improvement technique) to address these challenges.

MagLITE involves applying a transparent, VUV-compatible, Magnesium Fluoride layer over the external wavelength shifter. This top layer is designed to be hard, and durable, protecting the underlying structure, while also increasing photo-collection efficiency through thin film interference. Recent advancements in MagLITE have focused on improving the quality of the optical interface between layers by advancing deposition techniques and better controlling surface roughness.

In this work, we will discuss the recent improvements in deposition protocols that have significantly boosted the efficiency of light collection. We will present detailed measurements and results from our latest experiments, highlighting the enhanced capabilities of the MagLITE technique.

Primary authors: GELLI, Bruno (UNICAMP); KEMP, Ernesto (University of Campinas); MARQUES, Francisco (UNICAMP); GOMES DOS SANTOS, Gabriel (UNICAMP); SOLA, Rafael (UNICAMP)

Presenter: GELLI, Bruno (UNICAMP)

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