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High-Efficiency WLS Plastic for a Compact Cherenkov Detector

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The PHeSCAMI project (Pressurized Helium Scintillating Calorimeter for AntiMatter Identification) aims to detect anti-deuterium in cosmic rays by utilizing delayed annihilations ($\sim \mu\text{s}$) expected within a pressurized helium target. This technique relies on capturing the helium scintillation signal (80 nm), which requires a two-stage Wavelength Shifter (WLS) conversion.

This study presents experimental measurements of the second-stage WLS, using the FB118 material developed by “Glass To Power.” The absence of residual scintillation and the high efficiency of UV photon conversion in FB118 demonstrate its strong potential as a compact Cherenkov detector for CubeSats, enabling precise particle velocity measurements in the range of 0.75c to 0.95c. Furthermore, its possible application as a trigger layer for large-acceptance detectors operating at Lagrange Point 2 (L2), such as AMS-100 or ALADInO, will be explored. This could help address challenges related to the high trigger rate caused by the intense flux of sub-GeV protons beyond Earth’s magnetic field.

Eligibility for “Best presentation for young researcher” or “Best poster for young researcher” prize

No

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