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A fast muon tagger method for Imaging Air Cherenkov Telescopes

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The Cherenkov Telescope Array (CTA) will be the next major observatory for Very High Energy (VHE) gamma-ray astronomy. Its optical throughput calibration relies on muon Cherenkov rings. This work is aimed at developing a fast and efficient muon tagger at the camera level for the CTA telescopes. A novel technique to tag muons using the capabilities of silicon photomultiplier Compact High-Energy Camera CHEC-S, one of the design options for the camera of the small size telescopes (SSTs),has been developed, studying and comparing different algorithms such as circle fitting, machine learning and simple pixel counting.Their performance in terms of efficiency and computation speed was investigated using simulations with varying levels of night sky background light. The application of the best performing method to the large size telescope (LST) camera has been also studied, with the goal of improving the speed of the muon preselection.

Primary authors: PILLERA, Roberta (BA); Dr DI VENERE, Leonardo (BA); Dr GIAVITTO, Gianluca (DESY); Dr LOPEZ COTO, Ruben (PD)

Presenter: PILLERA, Roberta (BA)

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