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Description and characterization of a stereoscopic trigger system between the CTAO LST-1 and the MAGIC telescopes

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Abstract

We present the implementation and validation of a hardware stereoscopic trigger (HaST) linking the Large-Sized Telescope prototype (LST-1) of the Cherenkov Telescope Array Observatory (CTAO) with the MAGIC (Major Atmospheric Gamma-ray Imaging Cherenkov Telescope) telescopes at the Roque de los Muchachos Observatory. This setup enables real-time exchange of camera-level trigger signals, allowing joint data acquisition and providing a commissioning platform for the future 4-LST HaST system.

The performance of the system was studied through trigger rate scans, coincidence window optimization, and timing distribution analyses.

The results demonstrate the technical viability of the LST-1 HaST and confirm its role as both a proof of concept and a realistic test bench for the trigger architecture to be deployed in future CTAO operations.

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