ICRC2015

ICRC
The Astroparticle Physics Conference
34th International Cosmic Ray Conference
July 30 - August 6, 2015
The Hague, The Netherlands

Contribution ID: **372** Type: **Poster contribution**

Performance of Silicon Photomultipliers for the Dual-Mirror Medium-Sized Telescopes of the Cherenkov Telescope Array

Saturday, August 1, 2015 3:30 PM (1 hour)

Gamma-ray observations in the very-high-energy domain (E > 30 GeV) can exploit the imaging of Cherenkov flashes lasting a few nanoseconds from atmospheric particle showers. Photomultipliers have been used as the primary photosensors to detect gamma-ray induced Cherenkov light for the past 25 years, but they are increasingly challenged by the swift progress of silicon photomultipliers (SiPMs). We are working to identify the optimal photosensors of medium-sized Schwarzschild-Couder telescopes (SCT), which are proposed to contribute a significant fraction of the sensitivity of the Cherenkov Telescope Array in its core energy range. We present the capabilities of the latest SiPMs from the Hamamatsu, SensL, and Excelitas companies that we have characterized in our laboratories, and compare them to the SiPMs equipping the prototype SCT camera that is under construction.

Collaboration

CTA

Registration number following "ICRC2015-I/"

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Session Classification: Poster 2 GA

Track Classification: GA-IN