



A 256-pixel Imaging Camera based on Silicon PhotoMultipliers (SiPM) is being developed for a 4m class TACTIC atmospheric Cherenkov telescope. This is the first of its kind in India that uses SiPM as a pixel sensor in place of photomultiplier tubes. The Imaging camera covers a field of view of $5^\circ \times 5^\circ$ with a pixel resolution of 0.3° for the TACTIC telescope. A modular approach is adopted for the camera electronics design for quick development and easy maintenance. In this presentation we will discuss the design features and performance of the front end electronics of the camera.

The front end electronics of the camera consists of 16 Pixel Cluster Modules (PCMs) each catering to 16 pixels. A PCM consists of light concentrators, 16 pixel sensor boards, preamplifiers, low voltage supplies and a programmable bias supply system. The design requirements for the front end electronics are driven mainly by physics goals such as wide dynamic range, high SNR, a low charge resolution in presence of night sky background, gain uniformity over all pixels etc. The other important objective of the camera is to be able to resolve single photon response for accurate pixel gain calibration. Several other factors such as large size sensor, long time response, single p.e. resolution, etc., have also led us to a customized design of the preamplifier. SiPMs gain is highly dependent on ambient temperature. The gain, in turn, is proportional to the applied over-voltage. Also, gain uniformity over all 256 sub-pixels is required. Therefore a programmable bias supply system is designed.

Development of SiPM based imaging camera for a 4-m class telescope (Part 1)

**Ms. Shobha K Rao
(DHEP, TIFR Mumbai)**

September 29, 2023 at 4 p.m.

AG-66, TIFR Mumbai

YouTube Live Link:

<https://youtube.com/live/WqFVbhrOzdI?feature=share>

Shobha Krishna Rao is working as the Scientific Officer for DHEP Group at TIFR, Mumbai. She obtained Dip. In Electronics and Comm. Engineering and joined TIFR's CRL experiment at KGF. Subsequently, she worked for the HEGRO, INO and the HAGAR experiments. At present she is actively involved in the design and development of the Imaging Camera for TACTIC Atmospheric Cherenkov telescope at Mt. Abu.



We are on Social Media!

Twitter: @aset_tifr

Facebook: facebook.com/aset.tifr

YouTube: youtube.com/ASETForum

Web: www.tifr.res.in/~aset

Email: aset@tifr.res.in