



Contribution ID: 35

Type: **Poster**

CHARACTERIZATION OF SiPM SENSORS FOR THE dRICH DETECTOR AT THE ePIC EXPERIMENT

We report on the characterization of different types of Silicon Photomultipliers (SiPMs). SiPMs can detect and resolve single photons. They are considered as the baseline technology of choice to equip the dual RICH detector (dRICH) at the ePIC experiment at the future Electron-Ion Collider. One of the downsides of SiPMs is the presence of a Dark Count Rate (DCR) caused by thermal electrons which also depends on the bias voltage applied to the sensor. Such an effect can be minimized by lowering the temperature of the sensors. We will show results from current-voltage (IV) and DCR scans at different temperatures (-20°C, -25°C, -30°C). These measurements are critical to understanding how best to “control” the DCR, maintaining an optimal dRICH detector performance over a long period of time and, in fact, making sure that the SiPMs are the best sensors to use.

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Session Classification: Poster by night