

## Contribution submission to the conference Bonn 2020

**Automatized dark current measurement system for irradiated SiPM detectors in COSY** — ●ANOOP NAGESH KOUSHIK for the JEDI-Collaboration — Forschungszentrum Jülich GmbH — III. Physikalisches Institut B, RWTH Aachen University

The JEDI (Jülich Electric Dipole moment Investigations) collaboration performs Electric Dipole Moments (EDM) experiments with deuteron beams at COSY (COoler Synchrotron) accelerator in Forschungszentrum Jülich. The beam is polarized and the determination of the polarization is based on a polarimeter using LYSO scintillators coupled to SiPM (Silicon Photo-Multiplier) modules. SiPM are preferred over traditional PMT's because of absence of high electric fields near the beam which affects the EDM measurements.

SiPMs near the beam pipe were accidentally exposed to intense radiation and were damaged. This radiation damage adds noise to the signal and hence decreases the resolution of the detector. The dark current of the irradiated SiPM was characterized and was found to be orders of magnitude higher.

An automatized system of dark current measurement for different SiPM reverse bias voltages was developed. 8x8 array mapping of the SiPM was designed to analyze the extent of the damage of the irradiated SiPM. Few SiPM arrays were annealed several times at different temperatures and was compared to the previous annealed results to determine the reduction of the damage. Extent of damage, the results of annealing and the comparison between them for the irradiated SiPM will be presented and discussed in the talk.

**Part:** HK  
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**Topic:** Instrumentierung  
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