

Cooling Analysis of HV MAPS Detector in Vacuum

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The Measurement Of a Lepton Lepton Electroweak Reaction (MOLLER) experiment anticipates new dynamics beyond the standard model. The measurements are acquired by the scattering of longitudinally polarized electrons off the unpolarized electrons using a set of detectors in Hall A at Thomas Jefferson National Accelerator Facility (JLab) in Newport News, Virginia USA. In the present study, the ability of High Voltage Monolithic Active Pixel Sensors (HV MAPS) in the Hall A's Compton polarimeter is investigated to monitor the scattered electron profile. Monolithic active pixel sensors require an in-vacuum operation to allow low-momentum particles at high rates. To prevent damage, the electronics necessitate dissipating the heat and require a cooling system. The temperature measurement of the HV MAPS in vacuum is essential to understand the thermal properties of the pixel detector and cooling needs. This talk will review the continuous efforts towards the cooling strategies, structure modification, and other changes required to achieve in-vacuum operation. We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC).

Supervisor

Dr. Wouter Deconinck

Funding Agency

NSERC

Supervisor Email

wouter.deconinck@umanitoba.ca

Your Email

prabhak2@myumanitoba.ca

Primary authors: Ms SHEFALI, Shefali (University of Manitoba); Dr DECONINCK, Wouter (University of Manitoba)

Presenter: Ms SHEFALI, Shefali (University of Manitoba)

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