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PMT pre-calibration for SABRE South

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The DAMA experiments have detected a modulating signal compatible with dark matter for 20 years with a combined significance of 12.9σ . A result in tension for a spin independent WIMP with null results from large noble gas experiments. This is the motivation for SABRE (Sodium iodide with Active Background Rejection) South experiment. A NaI(Tl) based replication of the DAMA experiment. It is designed to test the DAMA modulation results using the same NaI(Tl) crystal target readout by 14 Hamamatsu R11065 photomultiplier tubes (PMTs) with a 1 keVee energy threshold.

This poster will report on the photomultiplier characterisation test bench developed for the photomultipliers of SABRE South and preliminary results from the first test batch of PMTs. This includes studies of the single photon response, quantum efficiency, and dark noise. The results of the photomultiplier characterisation are crucial to model and understand the low energy performance of the SABRE South experiment. This is crucial to ensure that SABRE South can provide an accurate and significant measurement of the DAMA signal.

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