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The Mu2e and MEG electromagnetic calorimeters

The Mu2e and MEG/MEG-II projects stand in the landscape of Intensity Frontier experiments searching for Charged Lepton Flavour Violation in the muon sector.

The Mu2e experiment will search for the conversion of a negative muon into a mono-energetic electron with a 104.97 MeV energy, and aims to improve the current experimental limit by a factor 10^4 .

The calorimeter will provide particle identification, a standalone trigger, and track-seeding, while granting $\sigma_E < 10\%$ and $\sigma_T < 500$ ps for 100 MeV electrons. It consists of two annular disks, each one containing 674 un-doped CsI crystals, readout by two large-area custom UV-extended SiPMs. The apparatus will have to sustain high particle rates (50 kHz/cm^2) in a 10^{-4} Torr vacuum, a 1T magnetic field, 100 Gy/y ionizing doses and $2 \times 10^{11} \text{ n}_{1\text{MeV}} / \text{cm}^2 \text{ y}$.

On the other hand, the MEG-II experiment, designed to search for the $\mu^+ \rightarrow e\gamma$ decay, will improve by 1 order of magnitude the MEG sensitivity.

The MEG-II experiment features the same MEG liquid xenon calorimeter, improved with a highly granular readout realized with 4092 custom VUV-extended SiPMs. The calorimeter is expected to have a $\sigma_E \sim 1\%$ and a $\sigma_T \sim 50\text{ps}$ for the 52.8 MeV γ -rays emitted in the decay.

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