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Experimental Limiting Factors for the search of $\mu \rightarrow e\gamma$ at Future Facilities

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The search for the Lepton Flavor Violating decay $\mu \rightarrow e\gamma$ exploits the most intense continuous muon beams, which can currently deliver $\sim 10^8$ muons per second. In the next decade, accelerator upgrades are expected in various facilities, making it feasible to have continuous beams with an intensity of 10^9 or even 10^{10} muons per second. We investigate the experimental limiting factors that will define the ultimate performances, and hence the sensitivity, in the search for $\mu \rightarrow e\gamma$ with a continuous beam at these extremely high rates. We then consider some conceptual detector designs and evaluate the corresponding sensitivity as a function of the beam intensity.

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