

# Measurement of the branching ratio of radiative muon decay at the Fermilab Muon g-2 experiment

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Studies of muon decay have helped established several parameters in the Standard Model. This decay is almost a pure weak decay and it allows for a high-precision test of the Standard Model and searches for new physics. Radiative muon decay (RMD) is particularly interesting because one of the Michel parameters, the eta parameter  $\eta$ , can be measured only via RMD. The branching ratio for RMD is about 5% for the photon energy above 1 MeV. However, recent measurements of RMD by PIBETA and MEG collaborations utilized muon decay at rest and only focusing on a tiny phase space of the decay. This is due to the challenges in detecting soft photons. In the Muon g-2 experiment, the relativistic gamma-factor of the muon is 29.3 and therefore a 10 MeV photon could be boosted up to 600 MeV. This opens up the possibility to measure a wider phase space of the RMD and therefore a more sensitive search for new physics that could alter the decay branching ratio. In this poster, we will present the current status of our study using Fermilab Muon g-2 experiment to measure the branching ratio of RMD.

**Primary author:** CHEN, cheng (Shanghai Jiao Tong University)

**Co-author:** Prof. KHAW, Kim Siang (Shanghai Jiao Tong University)

**Presenter:** CHEN, cheng (Shanghai Jiao Tong University)

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