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Fully differential NLO predictions for rare and radiative lepton decays

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We present a general purpose Monte Carlo program for the calculation of the radiative ($\mu \to \nu\bar{\nu}e + \gamma$) and rare ($\mu \to \nu\bar{\nu}e + e^+e^-$) muon decays at NLO in the effective Fermi theory. These processes are irreducible Standard Model backgrounds to searches for lepton flavour violation at the PSI experiments MEG and Mu3e as they become indistinguishable from the corresponding signals when the neutrinos carry little energy.

Furthermore, we argue that fully differential NLO corrections are very important for the analysis of measurements aiming at the percent level or better. This is especally true of very stringent phase-space cuts are applied. To illustrate this, we use a recent tension between BaBar's recent measurement of the radiative tau decay and the Standard Model prediction as an example of such an analysis.

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