

Beyond $E=mc^2$: Using Rare Particle Decays to Probe the Energy Frontier

Craig Dukes
University of Virginia

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Abstract: Although there is great excitement in particle physics these days, with the advent of the Large Hadron Collider upon us and the great discoveries we hope it will bring, for the first time in some seventy years there are no plans for any new accelerators to take us to the next energy regime. So we will need to look for tiny indirect signs such as rare particle decays in order to find out what may be lurking beyond what we can directly produce in collisions at particle accelerators. There is a long history of such searches for new physics, a history that predates particle physics itself. I will show how such searches will probe mass scales unobtainable by any conceivable particle accelerator and describe the types of accelerators and experiments that are being planned: in particular a high-precision muon magnetic moment experiment and a high-sensitivity search for lepton flavor violation in muon decays.