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(POS-72) Probing lepton flavour universality with PIONEER

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Inconsistencies between Standard Model (SM) predictions and various existing measurements point towards the potential violation of lepton flavor universality. The charged pion branching ratio to electrons vs muons $R_{e/\mu}$ is extremely sensitive to a wide variety of new physics effects, including those at very high mass scales, and is theoretically predicted to a precision 15 times better than existing measurements. This strongly motivates PIONEER, a new rare pion decay experiment aimed at improving the measurement of $R_{e/\mu}$ by an order of magnitude and also increasing the precision of the pion beta decay measurement by a factor of 3 to 10 from current experiments. PIONEER will be constructed at the Paul Scherrer Institute (Switzerland) and will use a combination of a silicon LGAD target providing both tracking and timing information, a deep calorimeter with high solid angle coverage, high-speed electronics, and more, to optimize its energy and time resolution. This talk will discuss the experiment design that will allow PIONEER to achieve such high precision in its measurements, and the significance its results will hold for potential physics beyond the Standard Model.

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