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Latest Results on Muon Decay from the TWIST Experiment¹

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The TRIUMF Weak Interaction Symmetry Test (TWIST) collaboration is searching for deviations from predictions of the Standard Model (SM) in polarized muon decay via precision measurements of the energy and angle for decay positrons. Measurements of muon decay parameters with high statistics ensure that the space-time structure of the low-energy weak interaction can be tested to the level of systematic uncertainties. Our goal is to improve the measurements of the muon decay parameters, ρ , δ and $P_\mu\xi$ by an order of magnitude over previous measurements thereby achieving sensitivity to physics beyond the SM at a level of a few parts in 10^4 . First results for the three parameters have been reported [1] which yield measurements that improve their precision by about a factor of three. Analysis is nearly complete for newer measurements of ρ and δ which should result in improvement by another factor of two in their precision. The experiment will be described, results of the most recent analyses will be presented and the expectations for the final results will be discussed.

[1] B. Jamieson et al., Phys. Rev. D **74**, 072007 (2006) ; A. Gaponenko et al., Phys. Rev. D **71**, 071101(R) (2005) ; J.R. Musser et al., Phys. Rev. Lett. **94**, 101805 (2005).

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