## Phenomenology 2018 Symposium



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## Testing Parity Violation using muon beam experiments

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We analyze prospects for probing A × V parity-odd interactions of muons with quarks,  $G(\bar{\mu}\gamma_{\alpha}\gamma_{5}\mu)(\bar{q}\gamma^{\alpha}q)$ , using the muon beam experiments at low and medium energy. While this operator is readily induced in the SM by Z-exchange, exotic models with sub-weak scale force mediator (Z') can have an enhancement of this operator by up to two orders of magnitude, G ~ (1–100)×G<sub>F</sub> . The P-odd scattering asymmetry can be accessed experimentally if there is a way of rotating muon spin polarization. Flipping of the muon spin is possible for the two muon beam experiments measuring muon g – 2 at FNAL and JPARC, and we estimate the statistical errors on the asymmetry that can be achieved with current muon intensities. We find that the JPARC experiment will be able to probe the size of the parity violation that is O(10) times larger than the SM prediction, while the FNAL setup would in principle be able to explore all the interesting range of G and eventually detect SM P-odd forces.

## Summary

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