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Probing the ν_R -philic Z' at DUNE near detector

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Hidden $U(1)$ symmetries in the right-handed neutrino (ν_R) sector are theoretically well-motivated and would give rise to an inherently dark gauge boson which we refer to as the ν_R -philic Z' . An important feature of this Z' is that its couplings to neutrinos are generally much larger than its couplings to charged leptons and quarks, providing a particularly interesting scenario for future neutrino experiments such as DUNE to probe. In this talk, I'll discuss two approaches to probe this Z' at DUNE near detectors via (i) searching for Z' decay signals and (ii) precision measurement of elastic neutrino-electron (ν - e) scattering. I will show that the former will have sensitivity comparable to or better than previous beam dump experiments while the latter will improve current limits substantially for large neutrino couplings.

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