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## Towards Measurements of Electroweak Nuclear Properties using Single Molecular Ions in a Penning Trap

We present the development of a novel Penning ion trap for precision spectroscopy of symmetry-violating electroweak properties using single trapped molecular ions [1]. The high magnetic field of the Penning trap can be used to Zeeman shift two molecular states of opposite parity to near degeneracy, enhancing the sensitivity of parity-violating nuclear properties by more than 11 orders of magnitude [2]. Hence, our proposed experimental setup is expected to provide highly sensitive measurements of symmetry violating nuclear properties across the nuclear chart. This contribution will describe the status of a cryogenic Penning trap for performing measurements in SiO+ and TIF+ molecules, as well as discuss future prospects of this technique.

[1] J. Karthein, S. Udrescu, S. Moroch et al. arXiv:2310.11192 (2023)[2] Altuntas, E. et al. Phys. Rev. Lett. 120, 142501 (2018)

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