

Single Ion Spectroscopy for Atomic Parity Violation

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A single trapped ion opens a promising path for a measurement of atomic parity violation (APV). Since the sensitivity of the APV grows stronger than the third power of the atomic number Z , a single Ra ion is an excellent candidate for APV experiments, enabling a precise measurement of the electroweak mixing angle in the Standard Model of particle physics. Online laser spectroscopy of $^{209-214}\text{Ra}^+$ isotopes in a linear Paul trap provided information on transitions wavelengths and hyperfine structure required for the interpretation of an APV measurement in Ra^+ . Current experiments are focused on trapping and laser cooling of few Ba^+ ions as a precursor for Ra^+ . Ba^+ ions are trapped and laser cooled in a precision hyperbolic Paul trap as a test. Work towards single ion trapping of Ra^+ is in progress.

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