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Extending Precision Atomic Mass Measurement to Higher Mass[1]
MATTHEW REDSHAW, BRIANNA MOUNT, EDMUND MYERS, Florida State University — Precise atomic masses of the alkalis and certain other metals are important for photon-recoil (h/m) determinations of the fine structure constant, while a series of precisely measured atomic masses up to high mass-number would provide convenient references for mass spectrometers used in nuclear physics. Using single ions in a Penning trap, with image charge detection and a phase-coherent technique for measuring the cyclotron frequency, we have measured the atomic masses of various heavy stable atoms, including ^{84,86}Kr, ^{129,132,136}Xe, with fractional precision of $\sim$0.1ppb; work on potassium and other alkalis is in progress. The measurements involve comparisons of multi-charged ions with singly-charged ions at similar m/q. Systematic errors originating from this difference in charge and other problems relating to high mass will be discussed.

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