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An Ultrahigh Energy-Range Thomson Parabola Spectrometer to Investigate Laser-Driven Proton-Ion Acceleration[1] BENJAMIN LAWRENCE-SANDERSON, HERNAN QUEVEDO, ANDREW YANDOW, University of Texas at Austin, GANESH TIWARI, Argonne National Laboratory (current), University of Texas at Austin (former), GRIFFIN D. GLENN, Stanford University (current), University of Texas at Austin (former), C. GRANT RICHMOND, MICHAEL DONOVAN, TODD DITMIRE, University of Texas at Austin — Here, we report the development of a Thomson Parabola Spectrometer capable of simultaneously resolving protons and low-Z ions across an energy range of 1-200 MeV. This new design utilizes a dual image plate and dual electrode-magnet pairs to achieve a 200 MeV energy range and a maximum relative error of $\Delta E/E < 2\%$. The first image plate collects the low energy protons and ions, but is offset from the neutral beam line to allow the higher energy particle to move on to a second electrode-magnet pair and image plate. This scheme decreases the size of the spectrometer's laboratory footprint. This new Thomson Parabola Spectrometer will be used to detect and resolve ion energy spectras generated from Texas Petawatt laser-driven ion acceleration experiments at high and ultra-high intensity regimes.

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