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Proposed Strong Field Ionization Experiments on the Texas Petawatt Laser ANDREW YANDOW, HERBIE SMITH, CONSTANTIN ANICULAESEI, HERNAN QUEVEDO, MICHAEL SPINKS, SANDRA BRUCE, MACKENZIE DARILEK, ERHARD GAUL, MICHAEL DONOVAN, BJORN MANUEL HEGELICH, TODD DITMIRE, Center for High Energy Density Science, University of Texas at Austin — We present experimental plans for studying strong-field ionization of noble gas atoms on the Texas Petawatt Laser at intensity exceeding 10^{20} W/cm^2. We propose indirect measurement of the K-shell ionization yields by using plastic scintillators to detect the high-energy ATI electrons produced by these ionization events. A new f/1.4 focal geometry we are commissioning on the Texas Petawatt will allow peak intensity exceeding 10^{20} W/cm^2 on rod amplifier shots and 3×10^{21} W/cm^2 for full-energy system shots, enabling the exploration of neon and argon K-shell ionization. The methods we propose should be scalable to intensity beyond 10^{21} W/cm^2, an intensity regime where ponderomotive scattering of ions from the focus will complicate direct measurements of the ion charge state yields by ion time-of-flight.

Andrew Yandow
Center for High Energy Density Science, University of Texas at Austin

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