Abstract Submitted
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Design of a pulsed-power driven platform to study photoionization fronts in the laboratory[1] DANNY RUSSELL, JACK HALLIDAY, SERGEY LEBEDEV, JERRY CHITTENDEN, AIDAN CRILLY, Imperial College London, ROBERTO MANCINI, University of Nevada, Reno, KRISTOPHER MCGLINCHEY, STEVEN ROSE, LEE SUTTLE, ELLIE TUBMAN, VICENTE VALENZUELA-VILLASECA, LONG CHOI, KATIA PAGANO, Imperial College London — Photoionization fronts play an important role in many astrophysical environments, including the development of galactic structure at the end of the Cosmic Dark Ages [1] and the formation of stellar-wind bubbles around O-type stars [2]. Despite their importance, predictions of photoionization front behaviour have yet to be tested in laboratory experiments [3]. We present designs for a new experimental platform for studying photoionization fronts using the MAGPIE pulsed-power facility (1 MA, 500 ns). A wire array Z-pinch will be used to produce an intense burst of X-Rays (10^4 J in 20ns) which will drive a photoionization front through a target. The target, a vaporised Al wire expanded to 10^{18} – 10^{19} cm^{-3}, will be driven by a separate generator (10kA, 20ns). Front properties will be diagnosed using 2-color laser interferometry, Thomson scattering and X-Ray absorption spectroscopy. [1] B. E. Robertson, Nature, 2010 [2] J. Mackey, Astronomy & Astrophysics, 2016 [3] R. P. Drake, The Astrophysical Journal, 2016

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