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High repetition rate laser-driven MeV ion acceleration at variable background pressures[1] JOSEPH SNYDER, Miami University Regionals, Hamilton, OH, GREGORY NGIRMANG, CHRIS ORBAN, The Ohio State University / Innovative Scientific Solutions, Inc. (ISSI), SCOTT FEISTER, FLASH Center for Computational Science, University of Chicago, JOHN MORRISON, KYLE FRISCHE, ISSI, ENAM CHOWDHURY, The Ohio State University / Intense Energy Solutions, LLC., W. M. ROQUEMORE, Air Force Research Laboratory, Dayton, OH — Ultra-intense laser-plasma interactions (LPI) can produce highly energetic photons, electrons, and ions with numerous potential real-world applications. Many of these applications will require repeatable, high repetition targets that are suitable for LPI experiments. Liquid targets can meet many of these needs, but they typically require higher chamber pressure than is used for many low repetition rate experiments. The effect of background pressure on the LPI has not been thoroughly studied. With this in mind, the Extreme Light group at the Air Force Research Lab has carried out MeV ion and electron acceleration experiments at kHz repetition rate with background pressures ranging from 30 mTorr to >1 Torr using a submicron ethylene glycol liquid sheet target. We present these results and provide two-dimensional particle-in-cell simulation results that offer insight on the thresholds for the efficient acceleration of electrons and ions.

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