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Observation of radiation pressure driven Rayleigh-Taylor instability C.A.J. PALMER, C. BELLEI, A.E. DANGOR, N.P. DOVER, S. KNEIP, S.P.D. MANGLES, S.R. NAGEL, A. REHMAN, Z. NAJMUDIN, Imperial College London, UK., J. SCHREIBER, A. HENIG, D. JUNG, D. KIEFER, LMU and MPI, Garching, Germany., M. YEUNG, M. ZEPF, QUB, Belfast, UK., A.P.L. ROBINSON, K.L. LANCASTER, R.J. CLARKE, C. SPINDLOE, CLF, RAL, UK., S.M. HASSAN, M. TATARAKIS, TEI, Crete, S. BOTT, F. BEG, Centre for energy research, UCSD, USA. — Radiation pressure acceleration (RPA)[1] uses the high pressures of a high intensity laser pulses to accelerate low mass targets to high energy with potentially low energy spreads. However, simulations have shown susceptibility to the radiation pressure driven Rayleigh-Taylor instability [1, 2]. Here we report on experiments performed with the VULCAN Petawatt laser at the Rutherford-Appleton Laboratory using intensities up to 10^{21} Wcm^{-2} in linear polarisation. Peaks within the C^{6+} spectra indicate RPA acceleration of the foils. Most remarkably though, strong spatial modulation is observed in the recorded proton beams. The form and extent of these modulations suggest Rayleigh-Taylor break-up of the foil. Simulations provide further support for these conclusions.

[1] A.P.L. Robinson et al., NJP, **10**, 013021 (2008)
[2] F. Pegoraro et al., PRL, **99**, 065002 (2007)

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