Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Laser Plasma Interactions at Shock Ignition Intensities and in NIF Direct Drive Ignition-Scale Ablation-Plasma Conditions[1]

ROBERT SCOTT, KEVIN GLIZE, STFC Rutherford Appleton Laboratory, NIGEL WOOLSEY, LUCA ANTONELLI, MATHEW KHAN, University of York, TONY ARBER, University of Warwick, MICHAEL ROSENBERG, WOLFGANG THEOBALD, ANDREY SOLODOV, KENNETH ANDERSON, WOLF SEKA, RUSS FOLLET, ANDEY MAXIMOV, CHUANG REN, JU LI, DAVID TURNBULL, RICCARDO BETTI, University of Rochester, KEITH BENNETT, University of Warwick, MINGSHENG WEI, University of Rochester, WARREN GARBETT, AWE, STEFANO ATZENI, A SCHIAVI, University of Rome La Sapienza, VLADIMIR TIKHONCHUK, DIMITRI BATANI, ALEXIS CASNER, University of Bordeaux — Experiments performed at Omega and the National Ignition Facility have, for the first time, diagnosed laser plasma interactions and the associated hot-electrons at laser intensities of direct relevance to the Shock Ignition approach to laser fusion, and in the ablation plasma conditions expected for direct-drive NIF-ignition designs. The experiments indicate Stimulated Raman Scattering (SRS) is the dominant hot-electron production mechanism. Importantly, the measured hot-electron temperatures are sufficiently low that the hot-electrons should deposit their energy within the implosion shell in-flight, rather than pre-heating the fuel. This opens the possibility that hot-electrons will aid the shock-generation process. Large scale particle-in-cell simulations support the experimental findings.

[1]Funded by EPSRC grants EP/P023460/1 EP/P026796/1.

Robert Scott
STFC Rutherford Appleton Laboratory

Date submitted: 03 Jul 2019 Electronic form version 1.4