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Hot Electron Generation Mechanisms in Ignition-Scale Direct-Drive Coronal Plasmas on the NIF MICHAEL ROSENBERG, ANDREY SOLODOV, WOLF SEKA, RUSSELL FOLLETT, ANDREI MAXIMOV, CHUANG REN, SHIHUI CAO, SEAN REGAN, RADHA BAHUKUTUMBI, TIMOTHY COLLINS, DUSTIN FROULA, JOHN PALASTRO, VALERI GONCHAROV, Laboratory for Laser Energetics, University of Rochester, JASON MYATT, University of Alberta, PIERRE MICHEL, MATTHIAS HOHENBERGER, GEORGE SWADLING, STEVEN ROSS, Lawrence Livermore National Laboratory, ROBBIE SCOTT, KEVIN GLIZE, Rutherford Appleton Laboratory — Planar experiments at the NIF have diagnosed laser-plasma interactions and hot-electron production at plasma conditions uniquely relevant to direct-drive ignition designs, in which hot electrons could potentially preheat the capsule. Stimulated Raman scattering (SRS) is observed at the quarter-critical density and at lower densities. Comparison of hard x-ray and SRS signatures indicates a correlation between underdense SRS and hot electron generation, though the saturated absolute SRS instability at quarter-critical may contribute as well. Measurements of $3\omega/2$ emission provide information about SRS and two-plasmon decay plasma waves near quarter-critical. LPSE and PIC modeling support interpretation of the experimental findings. These results are used to assess where in the density profile and through which physical mechanisms hot electrons are produced, which guides hot-electron preheat mitigation strategies for direct-drive–ignition designs. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

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