Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

**Theory and OSIRIS Particle-in-cell Simulations of Stimulated Raman Scattering in unmagnetized and magnetized Plasmas**[1] ROMAN LEE, University of California, Los Angeles, BENJAMIN WINJUM, Institute for Digital Research and Education, University of California Los Angeles, Los Angeles, FRANK TSUNG, WARREN MORI, University of California, Los Angeles — We use the particle-in-cell code OSIRIS to study stimulated Raman scattering (SRS) in magnetized and unmagnetized plasmas in a wide range of parameter space. We have previously shown how small magnetic fields can significantly modify the evolution of backward stimulated Raman scattering (SRS) in the kinetic regime ($k\lambda_{De} \approx 0.32$ for backscattered plasma wave) due to the enhanced dissipation of nonlinear electron plasma waves propagating perpendicular to magnetic fields. Driven by the collaboration between UCLA and UCSD, the range of validity of these results is extended, showing that they are valid in a wide range of parameter space, $k\lambda_{De} \approx 0.19 - 0.32$. Furthermore, we have identified a number of areas rich in complex, largely unstudied physics. This includes regimes in which magnetic fields appear to lead to enhanced SRS, which we believe to be related to rescatter appearing to reduce the amount of backscatter and diminished non-linear frequency shift in magnetized plasmas. This also includes frequently observed evidence of competition between forward and backward SRS and backscatter in strongly coupled regimes where $k\lambda_{De} \approx 1$. These observations offer promising opportunities for new avenues of research and future experime

[1]Work supported by DOE NNSA DE-NA0003842 and FES DE-SC0019010.

Roman Lee
University of California, Los Angeles

Date submitted: 29 Jun 2020 Electronic form version 1.4