



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 57

Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

Ray tracing analysis of stimulated Raman scattering in directly-driven inertial confinement fusion plasmas

Tuesday 8 June 2021 12:00 (15 minutes)

Experiments performed at the National Ignition Facility (NIF) have provided evidence that stimulated Raman scattering (SRS) occurs at a level that poses a preheat risk for directly-driven inertial confinement fusion implosions [1]. To help investigate the mechanisms responsible for the generation of this SRS, recent experiments on the OMEGA EP laser (in which similar SRS signatures were observed) were analyzed using a new ray-tracing model. The model is able to explain the time-dependent scattered light spectra from these OMEGA EP experiments: It identifies SRS side-scatter and near backscatter from portions of each incident beam, where either the scattered electromagnetic wave, or the electron plasma wave, are generated in the direction parallel to contours of constant density, as the origin of the major spectral features. As similar effects are known to occur at the ignition scale (on the NIF) [2], it is suggested that the OMEGA EP platform could provide a good surrogate in which to develop SRS mitigation strategies.

This material is based upon work supported by the Natural Sciences and Engineering Research Council of Canada [RGPIN-2018-05787, RGPAS-2018-522497]

[1] M. Rosenberg et al., Phys. Rev. Lett. 120, 055001 (2018).

[2] P. Michel et al., Phys. Rev. E99, 033203 (2019).

Author: HIRONAKA, Steven (University of Alberta)

Co-authors: ROSENBERG, Michael J. (Laboratory for Laser Energetics, University of Rochester, NY, USA); SOLODOV, Andrey A. (Laboratory for Laser Energetics, University of Rochester, NY, USA); SIVAJEYAN, Janukan (Department of Electrical and Computer Engineering, University of Alberta); WANG, James (Department of Electrical and Computer Engineering, University of Alberta); MYATT, Jason (University of Alberta)

Presenter: HIRONAKA, Steven (University of Alberta)

Session Classification: TS-3 Plasma Physics Symposium (DPP) / Symposium de physique des plasmas (DPP)

Track Classification: Symposia Day (DPP) - Low temperature plasmas/Fusion plasmas (magnetic and inertial confinement)/ Laser plasmas/Basic plasmas