Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Opacity effects on the polarization of the chlorine He-alpha line PETER HAKEL, ROBERTO MANCINI, University of Nevada, Reno — Polarization-based line spectroscopy is a valuable tool in determining the characteristics of the electron distribution functions in plasmas anisotropy is expected to be important. An example is the case of laser-produced plasmas driven by ultra-fast high-intensity pulsed lasers. Anisotropic electrons can unevenly populate magnetic sublevels of atomic energy levels resulting in partial polarization of the emitted spectral lines. Work done so far in this area has been performed in the optically-thin approximation, which typically is justified for satellite lines. However, recently this approach has been applied to resonance lines which can be optically thick under high-density conditions. Therefore we performed a modeling study of the He-alpha Cl line accounting for the effects of radiation transport on its polarization. This allows us to identify plasma regimes in which optically-thin approximation remains justified and those where opacity effects become important for this spectral line and the changes they introduce in the line polarization.

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Date submitted: 09 Jan 2008 Electronic form version 1.4