Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Polarimeter to measure density and magnetic field of merging plasmas at General Fusion[1] PATRICK CARLE, Queen's University — General Fusion (GF) is currently building a plasma injector for a prototype magnetized target fusion reactor. A second injector is under construction to investigate the merging of two spheromaks. In the near future, a system is to be built to acoustically compress the merged plasma, which is intended to show break-even energy gain. The purpose of merging two spheromaks is to create a hotter, stationary target, which is more suitable for compression. The merged product can take several different forms depending on the relative helicities of the merging spheromaks, such as a new spheromak or a field-reversed configuration. To date, the GF plasma injector has formed and accelerated spheromaks to densities of 10^{15}cm^{-3} and temperatures of 50eV, which will soon increase respectively to over 10^{16}cm^{-3} and 100eV. Due to these harsh plasma conditions, it is highly desirable to use non-perturbing diagnostics that do not need to be immersed in the plasma. For these reasons, a three-beam, heterodyne polarimeter is being assembled at GF. Polarimeters take advantage of the Faraday rotation effect, where a magnetized plasma rotates the plane of polarization of a light beam. With multiple probing chords, the profile of the plasma's magnetic field and density can be estimated without perturbing the plasma.

[1]Funding for this project provided by NSERC and General Fusion Inc.

Patrick Carle
Queen's University

Date submitted: 11 Aug 2011 Electronic form version 1.4