Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Development of Linear Image Sensor to Probe Coaxial Magnetized Plasma Jet Formation MAXWELL DE JONG, VERNON CHAPLIN, PAUL BELLAN, Caltech — The Caltech coaxial magnetized plasma jet experiment involves dynamics on sub-microsecond timescales, so fast diagnostics are needed. An expensive fast framing camera is currently used to study jet evolution. To take additional images of jet evolution from different angles, we developed an inexpensive photosensitive detector built around a high performance linear image sensor, the Dynamax ELIS-1024. The linear imager has an array of 1024 pixels with a variable exposure time as small as 10 ns. We designed a circuit to trigger the ELIS-1024 and amplify the output and mounted the circuit on a printed circuit board. The final system will be capable of taking 1D photographs of the plasma or serving as a detector on a spectrometer. Emission spectroscopy identifies the species in the plasma and enables electron temperature estimation through emission line intensity ratios and ion temperature estimation through Doppler broadening. Stark broadening may also be detected. The sensitivity of the detector to these features will be reported. The sensor is also being evaluated for use with a 1D coded aperture imaging system in a separate project.

Maxwell De Jong
Caltech

Date submitted: 11 Jul 2013 Electronic form version 1.4