Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Test, Construction, and Calibration of a Fast Valve Driver Unit (FVDU) and an Earth-isolated High Voltage Probe (HV probe) for a pulsed plasma experiment[1] YU KAMIKAWA, JENS VON DER LINDEN, SETTHIVOINE YOU, University of Washington, Seattle — A fast valve driver unit (FVDU) and an optically isolated high voltage probe (HV probe) [1] were built for an experiment to generate laboratory astrophysical jets with a triple electrode plasma gun [2]. The FVDU controls fast pulse gas valves (Parker P/N: 9S4-A1-P2-9B13, 090-0270-090) by converting an optical trigger input into a square 6V pulse output of a desired duration (100μs to 1ms) with an initial 250V shot pulse. A potentiometer controls the duration of the square pulse, corresponding to the open time of the valve. The solar cell powered HV probe measures, once triggered by an optical pulse, the voltage across the electrodes without exposing sensitive data acquisition instruments to high voltage. A custom made capacitive voltage divider couples the signal to a solar powered LED, which optically transmit the signal to a receiver circuit. The voltage across the electrodes controls the current driven across the jet and the azimuthal rotation of the jet.

[1] X. Zhai and P. M. Bellan, Rev. Sci. Instrum.83, 104703 (2012)
[2] J. von der Linden, S. You, this meeting.

[1]This work was sponsored in part by the US DOE Grant DE-SC0010340

Yu Kamikawa
University of Washington, Seattle

Date submitted: 12 Jul 2013 Electronic form version 1.4