Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Single-hit spectroscopy of betatron X-ray spectra generated by laser wakefield acceleration using self and ionization injection FLORIAN CONDAMINE, SLAC/LULI, WILL SCHUMAKER, JORDAN KOTICK, SLAC, FELICIE ALBERT, LLNL, BENJAMIN BARBREL, LBNL/CELIA, ERIC GALTIER, EDUARDO GRANADOS, SLAC, ALESSANDRA RAVASIO, LULI, ALAN FRY, SIEGFRIED GLENZER, SLAC — Betatron X-ray created by laser wakefield acceleration (LWFA) are of fundamental interest in plasma physics due to their broadband X-ray spectra, compact source size and ultra short duration. In particular, the femtosecond duration of electrons bunches produced during LWFA offers the opportunity to study warm dense matter (WDM) in detail via pump/probe experiments. In this study, we used the SLAC MEC optical laser (Ti:S 800nm, 1J in 40fs) focused in a gas cell to generate betatron X-ray by using two LWFA techniques : self-injection and ionization-injection. Three different gas types (100%, 98% and 90% helium, doped with nitrogen) were investigated using a single hit detector to characterize X-ray spectra generated by the betatron source. We will compare results with self-injection and ionization-injection for different plasma conditions and several positions of the laser focal spot inside the gas cell.

Florian Condamine
SLAC/LULI

Date submitted: 24 Jul 2015 Electronic form version 1.4