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X-ray radiation from a laser-wakefield accelerator in the self-modulated regime[1] FELICIE ALBERT, BRADLEY POLLOCK, JOHN RUBY, MICKAEL KLEM, ARTHUR PAK, FREDERICO FIUZA, JOSEPH RALPH, JOHN MOODY, Lawrence Livermore National Laboratory, JESSICA SHAW, NUNO LEMOS, KEN MARSH, CHRIS CLAYTON, CHAN JOSHI, UCLA, BENJAMIN GALLOWAY, JILA, WILLIAM SCHUMAKER, SIEGFRIED GLENZER, SLAC — We will present recent experiments performed using the Titan laser (150 J, 1 ps) at the Jupiter Laser Facility, LLNL. When a 0.5-1 ps laser pulse with an intensity approaching 10^{20} W/cm^2 is focused on a gas target (electron density 10^{19} cm^{-3}), electrons can be accelerated via the self-modulated laser wakefield (SMLWF) regime and the direct laser acceleration (DLA) regime. In SMLWF acceleration, electrons are accelerated by the plasma wave created in the wake of the light pulse, whereas in DLA, electrons are accelerated from the interaction of the laser field with the focusing force of the plasma channel. In our experiments, the SMLWF mechanism dominates, ($<10^{20}$ W/cm^2), and the transmitted laser spectrum exhibits intense Raman satellites which measured shifts depend on the electron plasma density. The high charge, $\sim$ 100 MeV electrons measured in our experiments are also a source of bright multi-keV x-ray beams of interest of future high energy density science applications.

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