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HED physics frontiers on OMEGA/OMEGA EP¹

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The 60 beam, 30 kJ, OMEGA laser facility has been operating at the University of Rochester for more than a decade. The OMEGA EP laser facility adjacent to it will be completed in Q3FY08. OMEGA EP will consist of four beamlines with NIF-like architecture. Each of the beams will ultimately produce 10 ns 6.5 kJ energy ultraviolet pulses directed into the EP target chamber. Two of the beamlines will also operate as high energy petawatt (HEPW) lasers, with up to 2.6 kJ each in 10 ps IR pulses. The HEPW beams can be injected into either the EP chamber or the existing OMEGA target chamber for integrated experiments. This talk will describe the OMEGA EP project status, HED physics possibilities using the combined system, and opportunities for external user access. The full OMEGA laser system (original 60 beam OMEGA and OMEGA EP) will allow unprecedented opportunities for HED physics research. These include backlighting of ICF implosions and integrated Fast Ignition Experiments in the OMEGA target chamber. The configuration flexibility of the OMEGA EP target area, will allow a wide variety of HED physics research, with the possibility of mixing and matching short and long pulse laser beams. Research areas will include episodic jets, the use of up to 40 ns long drive pulses for Equation of State measurements, short pulse, high intensity backlighting of otherwise opaque materials, and the possibility of creating an electron-positron plasma. The ongoing OMEGA EP Use Planning process will be described.

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