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Balmer Line Broadening in Laser Produced Hydrogen Plasma. LUTZ HUWEL, ROLAND VOLKL, YUDHISHTHIR KANDEL, Wesleyan University — Photoionized plasmas have been created in hydrogen by focusing a 10 ns, 20 Hz, 1064 nm Nd:YAG laser pulse into gas that is at a pressure of 10^5Pa. At the focus, the laser power density is about 10^{11} W/cm^2. The afterglow of these plasmas has been studied with a gated, intensified CCD camera in conjunction with a 0.6m monochromator. Time and spatially resolved light corresponding to the Balmer series has been observed from excited states with principal quantum numbers up to n = 11. Detectable emission occurred up to about 4 μs after plasma creation. The observed lines are heavily Stark broadened due to the plasma environment. Analysis of the spectral lines yields information on local excitation temperature and electron density. In particular, line widths of the highly excited lines have been compared with recent theoretical predictions. A detailed discussion of the findings will be presented. We will also present results of measurements concerning the influence on the hydrogen Balmer lines in such plasmas due to the addition of inert gases such as helium and argon. [1]J. E. Toumaa, E. A. Oks, S. Alexioua and A. Derevianko, *Review of the advanced generalized theory for Stark broadening of hydrogen lines in plasmas with tables*, J Quant Spectrosc Rad Trans **65** 543-571 (2000)

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