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Comparison different optical emissions based measurements of electron densities THOMAS MORGAN, SHABNAM KHALIGHI- MONFARED, LUTZ HÜWEL, Physics Department, Wesleyan University, Middletown, CT USA, BILL GRAHAM, Centre for Plasma Physics, Queen's University Belfast, Northern Ireland — The small size, restricted access and high gas densities make reliable electron density measurements difficult. As result emission-based techniques are often used. Here we compare the use of line splitting between the allowed and forbidden component of the 447.1 nm HeI emission line, the Stark broadening of the two HeI emission lines at 501.5 and 402.6 nm and Halpha and Hbeta lines to measure of electron density typical of those in a microplasma but in a more accessible plasma. The measurements were made in a plasma produced by a Q-switched Nd:YAG laser in atmospheric pressure He and He-Hydrogen gases. Emitted plasma light was dispersed in a 1m monochromator with an ICCD camera to record the spectrum. Our particular interest is in measurments at less than 1E16cm-3 corresponding to the plasma at times greater than about 5 microsecond after initiation. The results show that the density calculated values using Stark broadening using different emission lines of He agree to within 20%. These measurements are systematically higher than the values from peak splitting of the allowed and forbidden peaks. The enhanced access in this system should allow us shortly to compare these measurements with those made using Thomson scattering.

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