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Self-absorption of hydrogen Balmer lines in laser induced plasma. M.R. REZAEE, University of Tennessee, Knoxville, TN, C.G. PARIGGER, University of Tennessee Space Institute, Tullahoma, TN — In the study of self-absorption phenomena in laser-induced hydrogen plasma we focus on H_α, H_β and H_γ of the Balmer series. Broadened line profiles, shifts and line intensity ratios are commonly measured for plasma characterization and diagnostics in laboratory scale micro-plasma, for example, laser-induced plasma but are also measured to explore inductively coupled plasma and extraterrestrial plasma. One can infer the electron density and plasma temperature from measured spectra. Accurate diagnostics is important for applications in magnetically confined plasma devices as well as in quantitative laser-induced breakdown spectroscopy. Moreover, stability of plasma in Tokamak chambers is a function of electron density and temperature, and optical spectroscopy is utilized to find these values. Self-absorption however can cause extra broadening and distortion in line profiles. Here we present results that reveal evidence of self-absorption in H_α. We compare the electron density obtained from H_α with the ones obtained from H_β and H_γ, and we also discuss the determination of temperature from Balmer Series lines.

Christian Parigger
University of Tennessee Space Institute, Tullahoma, TN

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