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An experimental study of ion acoustic waves (IAW) in electronegative plasmas: can IAW measurements calibrate diagnostics for the measure of the negative ion fraction?[1] CAMRON PROCTOR, GREG SEVERN, University of San Diego — Electronegative plasmas are found in nature, in the lower ionosphere for example, and in plasma processing applications, such as vapor deposition, plasma etching, and particle beam sources. To understand the full potential of electronegative plasmas, a better diagnostic of their properties needs to exist. The negative ion fraction $\alpha = n_-/n_e$ determines, in part, the degree of electronegativity of plasmas. The fast mode of Ion acoustic waves (IAWs) are often used as a diagnostic for α, and are here studied with the intent to use IAWs to calibrate other diagnostics, such as the laser photodetachment technique, which does not furnish absolute measurements. The various diagnostics of α are reviewed. The electronegative plasmas studied were Oxygen and Argon/Oxygen DC discharges confined with a multidipole arrangement of permanent magnets, producing low temperature, low pressure, ($T_e < 1eV$, $T_i \ll T_e$, $p_0 < 1mTorr$) weakly collisional plasmas.

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Greg Severn
University of San Diego

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