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Negative ion density in magnetically confined low-pressure argon-acetylene plasmas using laser-induced photodetachment JOELLE MARGOT, GEORGES AL MAKDESSI, AHMAD HAMDAN, University of Montreal, RICHARD CLERGEREAUX, Laplace, Toulouse — In plasmas generated in reactive gases such as silane and acetylene, dust particles can spontaneously form provided the residence time of the precursors is large enough for allowing volume interactions to dominate over surface interactions. In discharges at intermediate pressure (e.g. 100 mTorr), anions are considered to be the most likely precursors to dust particles formation. In the present work, we examine the negative ion density in very low pressure conditions, namely 1-10 mTorr. For this purpose, we investigate magnetized dusty plasmas produced in argon-acetylene mixtures in which dust particles have been observed. The negative ion density is measured using a laser photodetachment technique. It is is observed to increase with the magnetic field intensity and to slightly decrease with increasing C_2H_2 percentage in argon. In addition, it decreases with increasing gas pressure. The photodetachment cross section deduced from the photodetachment signal as a function of laser energy is found to be significantly higher than the value expected for the C_2H^- ion, which may be explained by the presence in the plasma of negatively charged dust particles.

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