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Resonance Hair Pin Probe and Laser Photo Detachment Technique for Measuring Time Resolve Negative Ion Density in Pulsed DC Magnetron Discharge N. SIRSE, National Centre For Plasma Science and Technology, Dublin City University, Ireland, S.K. KARKARI, National Centre For Plasma Science and Technology, Dublin City University, Ireland and Institute For Plasma Research, Bhat, Ghandhinagar, India, R. DODD, S.-D. YOU, J.W. BRADLEY, Department of Electrical and Engineering Department, University of Liverpool, United Kingdom — The Resonance hairpin probe technique in conjunction with laser photo detachment has been applied in a pulse dc magnetron discharge to measure time-resolved negative ion density. The magnetron was operated at 10 kHz with a 50% duty cycle in argon-oxygen plasma. At a position close to the magnetic null 75mm from the cathode, the ratio of negative ion density to electron density was found to be higher (α $\approx$1.3) during the pulse off-phase than during the on-phase (α $\approx$0.3) due to a significant fall in the electron impact dissociation frequency of negative ions in the cooling off-phase. In the magnetized region of the discharge, where B $\approx$ 100 G, the decay in the photo-detachment density after the laser shot is longer as compared to measurements made in the field-free region (magnetic null) along the centre line. This phenomenon will be discussed in terms of cross-field transport and particle balance in Hall-type magnetized plasmas.

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