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Numerical simulations of the influence of an ion beam on the plasma analyzer performance in Njord helicon device WOJCIECH MILOCH, LEKHA MISHRA, NJAL GULBRANDSEN, ASHILD FREDRIKSEN, Department of Physics and Technology, University of Tromso, Norway — Recent experiments in Njord helicon plasma device confirmed the presence of an ion beam in a weakly magnetized plasma downstream from the double layer region [1]. The measurements were carried out with the retarding-field energy analyzer (RFEA). Since the housing of RFEA is biased with respect to the plasma, the plasma current to the orifice can depend on the sheath structure in its vicinity, and on its orientation with respect to the flow. Thorough understanding of the problem is needed for the analysis of data from such measurements. Numerical simulations allow to address this problem self-consistently. We simulate weakly magnetized plasmas with an additional ion beam for parameters relevant to experiments in Njord, and study the effect of a biased object, such as RFEA, on the surrounding plasma. The emphasis is given to the plasma flux to the surface, and the plasma energy distribution in the vicinity of the object. Our three-dimensional simulations are carried out with the upgraded DiP3D particle-in-cell numerical code [2], which accounts for collisions and external magnetic field. [1] A. Fredriksen et.al. Plasma Sources Sci. Techn. 19, 034009 (2010). [2] W.J. Miloch et.al. New J.Phys. 11, 043005 (2009).

Wojciech Miloch
Department of Physics and Technology, University of Tromso, Norway

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