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Kinetic simulation of neutral particle transport in sputtering processes[1] JAN TRIESCHMANN, SARA GALLIAN, RALF PETER BRINKMANN, THOMAS MUSSENBROCK, Institute of Theoretical Electrical Engineering, Ruhr University Bochum, STEFAN RIES, NIKITA BIBINOV, PETER AWAKOWICZ, Institute for Electrical Engineering and Plasma Technology, Ruhr University Bochum — For many physical vapor deposition applications using sputtering processes, knowledge about the detailed spatial and temporal evolution of the involved gas species is of great importance. Modeling of the involved gas dynamic and plasma processes is however challenging, because the operating pressure is typically below 1 Pa. In consequence, only kinetic descriptions are appropriate. In order to approach this problem, the dynamics of sputtered particle transport through a neutral gas background is simulated. For this study, a modified version of the three-dimensional Direct Simulation Monte Carlo (DSMC) code *dsmcFoam* [1] is utilized. The impact of a transient sputtering wind is investigated in a generic reactor geometry, which may be used for dc Magnetron Sputtering (dcMS), High Power Impulse Magnetron Sputtering (HiPIMS), as well as sputtering in capacitively coupled discharges. In the present work a rarefaction of the background gas is observed. Moreover in pulsed mode the temporal dynamics of the rarefaction and subsequent recovery of the background gas is investigated.

[1] T.J. Scanlon *et al.*, Computers and Fluids **39**, 2078–2089 (2010).

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