Abstract Submitted
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Interface model of plasma-surface interactions using artificial neural networks[1] FLORIAN KRUEGER, TOBIAS GERGS, Ruhr University Bochum, Germany, THOMAS MUSSENBROCK, JAN TRIESCHMANN, Brandenburg University of Technology Cottbus - Senftenberg, Germany — Plasma based materials processing relies on both the direct impact of the gaseous plasma on the solid surfaces and the feedback contribution of sputtered atoms from the surfaces onto the plasma. A self consistent theoretical description of this interaction is tremendously challenging due to the intrinsic time and length scales of the systems, which span several orders of magnitudes. Therefore, direct coupling of two distinct models is infeasible. Alternative strategies are required. In this work, an interface model based on artificial neural networks is suggested and tested. A multilayer perceptron network has been trained on data of Ar sputtering an Al-Ti composite target. The data set has been obtained using TRIDYN developed by Moeller and Eckstein [1]. It is demonstrated that the trained network can be successfully exploited to predict the energy distributions and angular distributions of sputtered and reflected particles for arbitrary energy distributions of impinging particles.
[1] W. Moeller, W. Eckstein, Nucl. Instr. and Meth. B2, 814 (1984)

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