

Plenarvortrag PV III Di 8:30 HS G
Plasma modeling as a tool to understand deposition rate loss in high power impulse magnetron sputtering — ●Nils Brenning¹, Daniel Lundin², Michael A. Raadu¹, Chunqing Huo¹, and Ulf Helmersson² — ¹Royal Institute of Technology, Stockholm, Sweden — ²Linköping University, Linköping, Sweden

The lower deposition rate for high power impulse magnetron sputtering (HiPIMS) compared to direct current magnetron sputtering for the same average power is often reported as a drawback. The often invoked reason is back-attraction of ionized sputtered material to the target,

due to a substantial negative potential profile from the location of ionization towards the cathode. Recent Langmuir probe and fast imaging data is used to benchmark two different types of plasma models for different regions of the HiPIMS discharges, with special focus on the problem of electric fields in the high density plasma region and their effect on the transport of ionized sputtered material. We propose two different mechanisms to be dominating in different regions: *ionization driven* in a rather stable ionization region extending a few cm from the target, and ”transport driven” in the highly dynamic surrounding bulk plasma.