Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

A real-time model for secondary electron emission coefficients in low temperature plasmas[1] MANASWI DAKSHA, West Virginia University, JULIAN SCHULZE, Ruhr University Bochum, West Virginia University — Low temperature plasmas are an indispensable tool in the processing of highly technical devices. However, the predictive power on the behavior of such plasmas is limited. This is, in part, due to plasma-surface interactions. In modeling such plasmas, it is important to know the electron sticking and the ion-induced secondary electron emission coefficient. Experimental determination of secondary electron emission coefficients (SEEC) is difficult at low ion energies. Therefore, there is only a few amount of metals and metal-oxides that have determined coefficients for a small set of surface conditions. A theoretical model is required to predict and explain these coefficients for a wide range of materials and conditions. Here, SEECs due to potential auger emission are calculated ab initio. They are calculated for metal-oxides and metals with varying surface conditions. These conditions include plane orientation and crystallinity. Furthermore, many gases are considered including argon and oxygen. Excellent agreement is found between experiment and theory for metals. The theory predicts the secondary electron emission to vary widely depending on the metal-oxide crystal structure and purity. This has been found to be true experimentally for magnesium oxide.

[1]US NSF grant no. 1601080

Manaswi Daksha
West Virginia University

Date submitted: 29 May 2017 Electronic form version 1.4