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Ion-Induced Gas Desorption Modeling in High Vacuum Systems*

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Ion beam interaction with walls desorbs gas and electrons. The gas can move to the beam path and be ionized. In a positively-charged particle beam the produced ions are expelled by the space-charge beam potential and the electrons are trapped inside a potential well. This ubiquitous effect grows at higher fill factors (ratio of the beam to the tube radius) and degrades the quality of the beam. In order to simulate it, we measured the gas desorption yield of stainless steel using the Gas-Electron Source Diagnostic in two distinct high vacuum facilities (High Current Experiment at LBNL and the 500 kV Ion Source Test Stand at LLNL). The desorption process is result from the interaction of the surface gas layer with ion-induced electrons. The experimental results will be discussed and compared with a theoretical model.

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