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Secondary electron emission yield dependence on the Fermi level in Silicon[1] DAVID URRABAZO, MATTHEW GOECKNER, LAWRENCE OVERZET, University of Texas at Dallas — Secondary Electron Emission (SEE) by ion bombardment plays a key role in determining the properties of many plasmas. As a result, significant efforts have been expended to control the SEE coefficient (increasing or decreasing it) by tailoring the electron work function of surfaces. A few recent publications point to the possibility of controlling the SEE coefficient of semiconductor surfaces in real time through controlling the numbers of electrons in the conduction band near the surface. Large control over the plasma was achieved by injecting electrons into the semiconductor just under the cathode surface via a subsurface PN junction. The hypothesis was that SEE is dependent on the numbers of electrons in the conduction band near the surface (which is related to the position of the Fermi level near the surface). We are testing the validity of this hypothesis. We have begun fundamental ion beam studies to explore this possible dependence of SEE on the Fermi energy level using Si. Various doping levels and dopants are being evaluated and the results of these tests will be presented.

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David Urrabazo
University of Texas at Dallas

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