Abstract Submitted
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Technological Concepts for Enhancing Semiconductor Ion Implantation Sources[1] ADY HERSHCOVITCH, Brookhaven National Laboratory — Two novel ideas for improving ion sources for the two energy extremes of ion implantation for semiconductor manufacturing are described. Since the invention of the transistor, semiconductor devices have been miniaturized. As semiconductors become smaller shallow implantation is desired and ion energy needed for implantation decreases, resulting space charge (intra-ion repulsion) effects, which reduced beam currents and production rates. To increase production rates, molecular ions are used. Carborane, which is the most stable molecular boron ion leaves unacceptable carbon residue on extraction grids. Special O_2 elliptical cross section dissociator that injects O unto the grid can in-situ prevent carbon deposition without loading up power supplies. Pure gaseous processes are desired for enable rapid switch among ion species. For deep implantation and for avoiding the use of over molecular phosphorous and arsenic can be generated by introducing phosphine in dissociators via $4PH_3 = P_4 + 6H_2$ in a pure gaseous process (same for arsenic AsH_3). In the ion source molecular or high charge state phosphorous and arsenic can be generated. Concepts and devices will be presented.

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