Abstract Submitted
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Ion Implantation in Topological Insulator Bismuth Selenide[1] PETER SHARMA, V. STAVILA, D.L. MEDLIN, A.L. LIMA SHARMA, M. HEKMATY, K. HATTAR, R.S. GOEKE, K.J. ERICKSON, Sandia National Laboratories — The coupling between bulk and surface conductivity remains a major problem for understanding the transport properties of topological insulator surface states. For instance, topological insulator bismuth selenide must be doped in order to reduce bulk conductivity. Existing methods utilize equilibrium bulk doping in the melt or non equilibrium doping during thin film growth. We introduce a new method of doping using ion implantation of Ca in prototypical topological insulator bismuth selenide. Ion implantation is potentially suitable for a wide range of dopants and compatible with existing semiconductor fabrication processes. Ca doping is known to yield p-type material, while native bismuth selenide is n-type. Therefore, implantation of Ca should decrease bulk conductivity. We evaluate microstructural damage and dopant activation associated with ion implantation in order to assess the feasibility of this doping method.

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Peter Sharma
Sandia National Laboratories

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