Abstract Submitted
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Local structure and spin states of Mn-Co and Fe-Co codoped Ge epitaxial films of dilute magnetic semiconductors[1] BRIAN COLLINS, LIANG HE, FRANK TSUI, University of North Carolina at Chapel Hill, YONG CHU, DANIEL HASKEL, EVGENY KRAVTSOV, APS Argonne National Laboratory — Codoping with Co has been shown to promote successful dilution of magnetic dopants of Mn and Fe into Ge up to a combined doping level of 15 at. %. Local structure, magnetic moment, and spin-dependant states of these diluted magnetic semiconductors (DMS) have been probed as a function of composition using X-ray and tunneling spectroscopy techniques. Extended X-ray Absorption Fine Structure (EXAFS) measurements reveal an increased level of substitution for each dopant species with respect to traditional single dopant DMS materials. A codoped environment results in 70% of Mn and 90% of Co successfully incorporating substitutionally into the Ge lattice. The remaining dopants are seen to form interstitial dimmers and trimers rather than metallic precipitates. Tunneling spectroscopy measurements on these systems through Al_2O_3 barriers using both Nb and Fe as spin detectors will be discussed in their correlation with the structural results.

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