Abstract Submitted
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Controlled introduction of defects in GaMnAs and GaBeAs thin films by ion-beam irradiation[1] MARCELO SANT'ANNA, ELIS SINNECKER, TATIANA RAPPOPORT, MAURICIO PIRES, GERMANO PENELLO, DAVID SOUZA, SERGIO MELLO, JOAQUIM MENDES, Universidade Federal do Rio de Janeiro, JACEK FURDYNA, XINYU LIU, University of Notre Dame — The existence of interstitial Mn atoms, and other point defects, significantly modify magnetic and transport properties of $Ga_{1-x}Mn_xAs$. This opens a door to manipulate these properties in a controlled way by ion-beam irradiation of thin films. We study how the simultaneous lowering of hole concentration and increasing of disorder, introduced by ion-beam irradiation, affects the magnetization and conductivity of $Ga_{1-x}Mn_xAs$ samples [1,2]. Highly doped $Ga_{1-x}Be_xAs$ is a material that can be produced with similar doping levels but that shows no ferromagnetism, acting as an interesting experimental standard for comparison of transport properties of $Ga_{1-x}Mn_xAs$. We irradiate $Ga_{1-x}Mn_xAs$ and $Ga_{1-x}Be_xAs$ thin films with 2 MeV oxygen ion beams. Samples were grown by molecular beam epitaxy. Sheet resistance of the thin films was measured in situ in the irradiation chamber as a function of the incident dose.

[1] E. H. C. P. Sinnecker et al., Phys. Rev. B. 81, (2010) 245203.
[2] M. M. Sant'Anna, et al., Meth. in Phys. Res. B. 273 (2012) 72.

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