Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Transport Properties of $Ga_xCr_{1-x}N$ thin films synthesized by MBE STEPHEN WU, HONGXUE LIU, RAKESH SINGH, NATHAN NEWMAN, Arizona State University — The electrical transport properties of ferromagnetic single phase Cr-doped gallium nitride films grown by reactive molecular beam epitaxy were investigated by performing Hall and resistivity measurements as a function of temperature over a wide range of dopant concentrations. For Cr concentrations at 3%, the films are highly resistive and the thermally activated electron transport follows the exponential law, $R=R_o\exp[(T_o/T)]^{-1/4}$, characteristic of variable range hopping between localized states in an impurity band [1]. This relationship does not explicitly hold over a significant temperature range for other Cr concentrations. The physical mechanism responsible for the differences in the electrical properties of these films will be elucidated by comparing the transport processes involved with the fraction of Cr atoms situated on Ga substitutional sites as measured by RBS ion channeling and the ferromagnetic properties determined using a variable temperature vibrating sample magnetometer. [1] N.F. Mott, *Philos. Mag.*, **19**, 835 (1969)

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Date submitted: 05 Dec 2005 Electronic form version 1.4