Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Diffusive Spin Transport of Lattice Fermions in One Dimension
ANDREW SNYDER, THEJA DE SILVA, Binghamton University — We study the long-time spin transport of fermions moving diffusively in a one dimensional lattice due to a directly introduced population imbalance and harmonic trapping potential. We combine the thermodynamic Bethe anzatz technique with the local density approximation to calculate local quantities such as magnetization and polarization. Utilizing Fick's Law, we are able to calculate the ratio of spin current to spin diffusion coefficient for both the weak and strong coupling cases that is driven by the population imbalance. We find spin current is characterized by magnetization moving from regions of low magnetization to high, with spin current being zero through insulating regions. Further, in the weak coupling limit, utilizing the linear response theory and calculating current-current correlation, we calculate local spin diffusion coefficient. The local spin diffusion coefficient shows maxima at all the insulating regions.

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Date submitted: 08 Nov 2012 Electronic form version 1.4