

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Correlations in Low Dimensional Systems

By

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We examine three different low dimensional condensed matter systems.

The first part is concerned with the one dimensional quantum Ising model in a transverse magnetic field. Using exact results for the correlators of the classical two dimensional Ising model we show how to obtain two point correlators of the order parameter field for two different regimes.

In the second part we study the problem of two spin-1/2 Heisenberg chains interacting at a single point. Using equivalences between different models we show that the correlators of the physical fields have non universal exponents.

Finally, we explore the possibility of spin density wave formation in grapheme (two dimensional graphite layer) that may be facilitated by the application of a magnetic field in the direction of the plane of the grapheme sheet. We find an order parameter that combines sublattice valley and spin degrees of freedom. Due to reduced dimensionality, we pay special attention to critical fluctuations.

Date: April 27, 2007

Time: 3:30pm

Place: Physics Building, Room B-131

Program: Physics

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