

# SEMINAR IN PHYSICS

Friday, February 15, 2019  
3:30-4:25 – Ross 0220

~ Refreshments ~

## **Solutions to the Ising Model and Spontaneous Phase Transitions**

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The Ising model and phase transitions within magnetic materials are introduced alongside some common approaches for solving for the critical temperature. Boundary free energy and the method used by Zandvliet and Hoede in their 2009 paper "Spontaneous magnetization of the square 2D Ising lattice with nearest- and weak next-nearest-neighbor interactions" are discussed in the context of finding the critical temperature of the Ising model.

Other phase transitions are considered in using this method to find the critical variables for a phase change.

## **Using a Shoebox Spectrograph to Investigate the Difference Between Reflection and Emission**

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*UNC Physics Major*

Throughout this paper, what a spectrograph is and what it does is further clarified. The original intention of the paper, I believe, was to display how a lower budget spectrograph could be made while still being concise. To make such a device requires a high level of understanding of how the original device operates.

Because of this, readers are able to gain some more understanding of their own. Not only does it show what makes the shoe-box level of spectrograph work by explaining and showing the math associated with the rays of light diffracting into the view-port, but this project also showcases how a spectrograph interacts with different forms of light including lasers and even gas.

Something that may or may not have not been a little bit of a surprise to a few is that what is being seen in the view-port happens to be an image of the original object, aka the light rays; however, because the view-port is at the incidence of the diffraction, what is seen does not thoroughly match with what the light source seems to project.