PHYS4450 Solid State Physics

**SAMPLE QUESTION FOR DISCUSSION IN WEEK 6 EXERCISE CLASSES
(27 February 2013))**
You may want to think about it before attending exercise class.

SQ9 **(Related to Problem 3.2. How to plot higher dimensional dispersion relations.)**

TA: Discuss how one can plot the dispersion relation with the x-axis representing different lines in the 1st BZ. (You may pick a 2D example.) Also discuss how to plot the dispersion relation as a 3D plot using a software. [Note: This skill will be used again in plotting electronic band structures.]

SQ10 **(Related to Problem 3.3.)** In class notes Ch.VII and in Statistical Mechanics, we showed that there is a T^3 dependence in C_V at low temperatures (Debye model of 3D solids). This is a **universal behavior**. We also used a **hand-waving argument** to get at the result. In Problem 3.3 for a 2D solid, we extract the low-temperature C_V using the Debye approximation. Here, the TA will apply the hand-waving argument to 2D case.

SQ11 (Related to literature research for your presentation) **How to search newer papers that cited a key reference?** Very often, you have a key reference in hand. Let's say it was published in 2007. You may want to see whether there are newer works that have cited the paper in 2007. There is a way to do that. The TA will demonstrate how to use a (very costly) tool called the "Web of Science" to do such a search. In recent years, Google also provided a similar function for free. TA may also want to show students how to search for introductory articles in *Physics Today*, *Physics World*, and *Scientific American*.