Department of Physics, University of Maryland, College Park, MD 20742-4111

Physics 731 HOMEWORK ASSIGNMENT #10 Deadline: **Tuesday, Dec. 11, 2007 (last class)**

Final exam: Monday, Dec. 17, 10:30a.m., room 4220 (usual classroom)

You may bring your [personally prepared!!] **crib sheet** from the midterm test, with the other side (or a second sheet) now including information about the material covered since then.

Reading: A&M chapters 17 (330-344, skim remainder), 18 (354-360, 365-369, skim remainder), F&J sections 7.1, 7.2.2, 12.2, 12.3, 14.1.1, 17.3.1, 17.3.2, 17.3.4, 19.4.2; and excerpts from posted articles.

Problems to turn in (read the rest):

1. 17-4 and verify the equation for $\varepsilon_k/\varepsilon_k^o$ in Fig. 17.1. Read the other problems, esp. 17.5, but you do not need to solve them or turn them in.

2. Starting from the one-dimensional form of eqn. (17.56), i.e. with a 1d integral

$-e^2 \int(dk/\pi) \times$ the same integrand with scalar k and q, find $\chi(q)$ associated with the Lindhard dielectric function in one dimension at T=0. This calculation is much simpler than that in 3 dimensions that yields (17.58), which you can find in most texts on many-body theory, e.g. Fetter and Walecka. Sketch your result and discuss how it differs from (17.58).

3. 33–4, parts b, c

The 4th problem would have involved the discussion of Wigner crystallization from §19.4.2 of Feng & Jin. You should, nonetheless, read that section!