

6.730 PHYSICS FOR SOLID STATE APPLICATIONS

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**PROBLEM SET 2**

Issued: 2-14-01

Due: 2-21-01, at the beginning of class.

**Readings:**

PSSA Chapter 3

PSSA Chapter 4

Ashcroft and Mermin, Chapters 3

and Ashcroft and Mermin, Chapters 23

**Problem 2.1** *Classical Limit of Fermi-Dirac Statistics* **PSSA Problem 3.1 parts a—d**

This problem shows how if one assumes the Boltzmann factor (Eqn. 3.77), then the classical results that we quote many times in class follow.

**Problem 2.2** *Two Dimensional Electron Gas* **PSSA Problem 3.2**

**Problem 2.3** *One Dimensional Electron Gas* **PSSA Problem 3.3**

**Problem 2.4** *Two-dimensional elastic continuum* **PSSA Problem 4.5**

This problem helps you review the arguments that were done in class and extend them to a different dimension.

**Hint:**  $\mathbf{T} = \lambda e\mathbf{I} + 2\mu\mathbf{E}$ .