

PHYS 402: Electricity & Magnetism II  
Due date: Thursday, November 17, 2011

**Problem set #9**

Griffiths (3<sup>rd</sup> Ed.) problems  
11.14, 11.17, 11.23

**Poisson's shadow**

A laser beam of wavelength  $\lambda$  and a very large diameter is incident (normal) on a screen that contains a hole that is small enough that the intensity of the laser,  $I_0$ , over the hole is constant. If  $d$  is the diameter of the hole, then find the on axis intensity of the light as function of distance from the hole  $I(z)$ . You will need to approximate the integrand of the Kirchoff integral. You may do the calculation in either the Fresnel limit or the Fraunhofer limit.

