

PHYS 404 and 690-03

Problem set due Monday, April 26, 2010.

The Quantized Electromagnetic Field

1. Meystre and Sargent, problem 13.2
2. Meystre and Sargent, problem 13.6
3. For a coherent state $|\alpha\rangle$ with $\alpha=10$ calculate:
 - a) the mean photon number.
 - b) the fluctuations or variance of the photon number.
 - c) the quantum uncertainty in the optical phase.
4. Calculate the Casimir force in Newtons between two conducting plates of area 1 cm^2 each separated by a) 1 mm and b) $1 \text{ }\mu\text{m}$.