

Fall 2015 PhD Preliminary Written Exam
Problem 7
Optics
Fall 2015

A parallel plate Fabry-Perot cavity has a length of L , and two mirrors with reflectivity, R .

- a) If one mirror is perfectly flat and the other has a roughness with an average height of δ , what is the maximum Finesse of the mirror? (2 points)
- b) What if both mirrors are rough? (If you are going through lengthy calculations to get this part, you are doing it wrong.) (1 point)
- c) How does the result you found in parts a) or b) affect the threshold gain needed to initiate lasing if the Fabry-Perot is filled with a solid-state material of gain g_{th} (with units of cm^{-1})? (1 point)