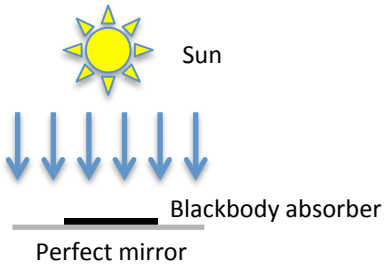
EE Ph. D. Qualifying Exam. Jan. 25-29, 2016. Shanhui Fan. Engineering Physics

(a) Suppose the sun can be approximated as having a temperature of 6000K. Sketch the emission spectrum of the sun.

(b) Consider the following solar heating experiment, where the direct sunlight is normally incident upon a piece of blackbody backed by mirror. The blackbody is placed somewhere near earth. What is the maximum temperature that the blackbody can reach?



(c) Consider instead the experiment where one places a lens in front of the blackbody absorber to focus the sun light onto the blackbody. Could you sketch how would you predict the temperature of the blackbody?

(d) If one can use a lens that can have arbitrarily large aperture, what is the maximum temperature that the blackbody can reach?