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**Problem Set 8**Due **before 1:00pm** Wednesday 2 Dec, 2020

**Readings:** Readings for this week are to read Chapter 8, and sections 9.1 and 9.2 of Chapter 9 of Thorne & Blandford *Modern Classical Physics*, hereafter called TBMCP. Astronomers may wish to also skim sections 9.3 and 9.6, and those interested in LIGO sections 9.4 and 9.5 —these are all interesting and important, but not examinable in this course.

**Non-Collaboration Problem** Notice that problem 1 is a non-collaboration problem: you must solve this problem on your own (as if it were an untimed quiz), without discussing it with other students, or with the TA (see the collaboration and grading policy for how these will be graded and used: <http://www.its.caltech.edu/~esp/ph136a/Policies.pdf>)

**Submitting your homework** Please upload your completed homework solutions as a pdf file to Canvas. If that fails to work, you may instead email the file to the TA, [twang3@caltech.edu](mailto:twang3@caltech.edu), with the subject line **ph136 homework 7**. Note that Caltech email will reject attachment sizes larger than 10Mbyte, so be conscious of scanning parameters!

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**Homework Problems: (45 points total)**

1. **TBMCP Problem 8.5 NONCOLLABORATION (8 points)** *Pointillist Painting* The answer does depend somewhat on how brightly lit the painting is: you may want to measure the diameter of your eye's pupil by looking in a mirror (or taking a selfie) indoors in typical "museum lighting" and again outdoors in full sunlight (bad for paintings, since the UV fades many paint pigments).
2. **TBMCP Problem 8.6 (15 points: 6+4+5)** *Light Scattering by a Large, Opaque Particle*
3. **TBMCP Problem 9.2 (10 points: 5 (separation)+5 (# fringes))** *Lateral Coherence of Solar Radiation*
4. **TBMCP Problem 9.6a (12 points)** *COBE Measurement of the Cosmic Microwave Background Radiation* Do only part (a).