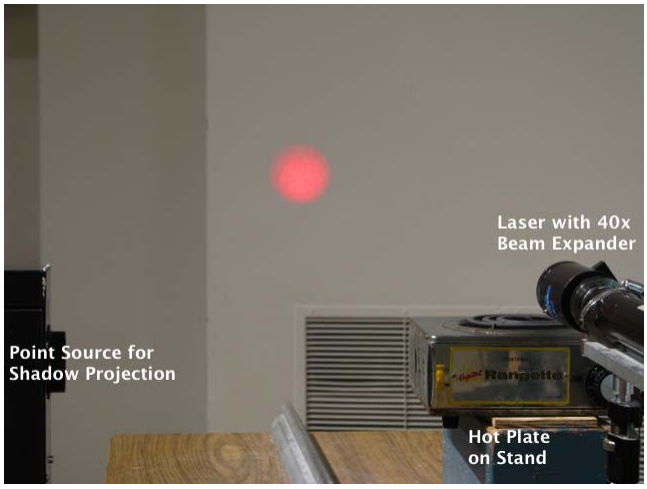
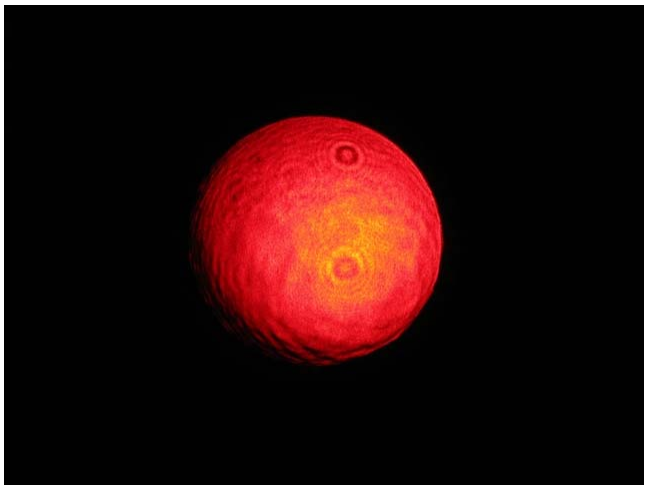
Question #352

Last week in Question #351 we discussed how a fine laser beam is affected by rising hot air currents -- the same effect noticeable in twinkling stars. This week we "zoom in" on our celestial being and consider how these currents may affect a larger image of light, as if the Moon or some planet were viewed much, much closer. In environmentally conscious efforts, we have saved the cost of space travel and have instead strapped a 40x beam expander to last week's laser to enlarge the image.



When the hot plate is off, the expanded laser beam remains stationary on the wall, just as the point from the laser beam did before. Using a carefully mounted camera on a rigidly secured tripod, a brief 5-second video showing the circle of light stationary on the wall can be viewed by clicking the image below. One can notice interference patterns caused by the tiny internal reflections of the laser as it is magnified, forming the little "craters on the surface." Rather *does* look like the Moon doesn't it?



Alternate high-res version.

Question: The stakes have changed, but the question remains the same. When the hot plate is turned on, hot air convection currents will rise from the heater and into the path of the beam. How will the image on the wall be affected?

- (a) The circular image will shift upward, since the currents are rising and pushing the beam towards the ceiling.
- (b) The circular image will wiggle, as did the image of the fine laser beam.
- (c) The circular image will not wiggle but stretch into an ellipse with a vertical major axis, owing to the air currents rising towards the ceiling.
- (d) The circular image -- owing to its considerably larger size -- will not wiggle and remain as a circle, unaffected by the transparent air currents.
- (e) Other (you must explain).

Click here for Answer #352 after October 5, 2009.

Question of the Week

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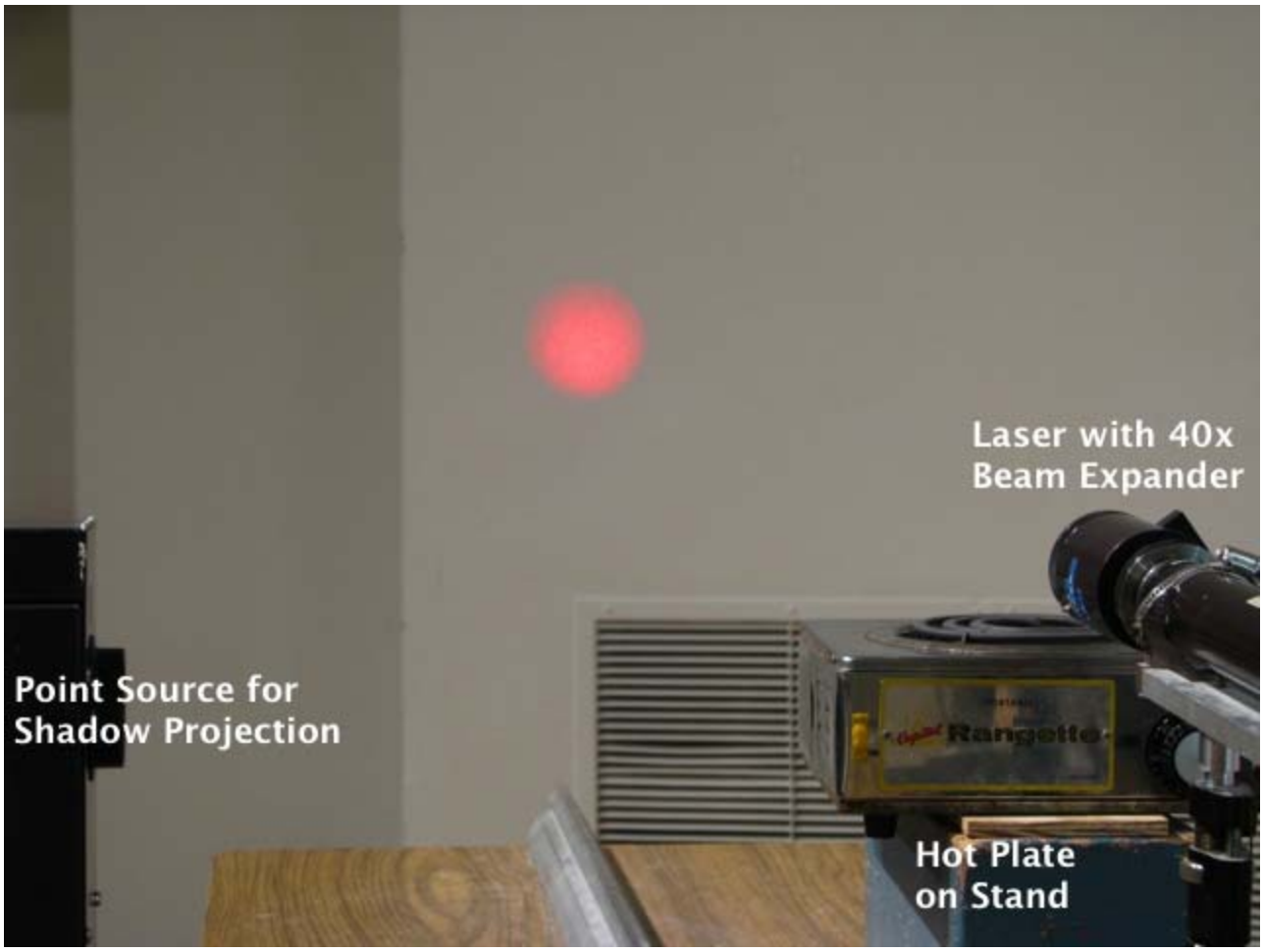
For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.


Laser with 40x
Beam Expander
Point Source for
Shadow Projection
Hot Plate
on Stand


BEAM
EXPANDER
40X