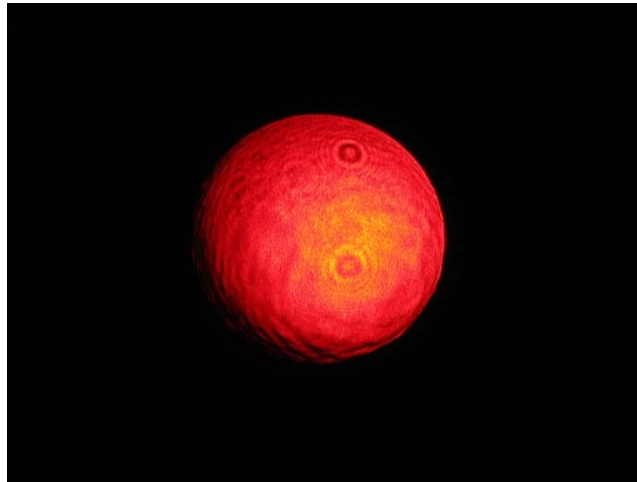


## Answer #352

Believe it or not, the answer is (e); though the circular image will not wiggle and remain as a circle, it does *not* remain unaffected by the hot air currents. But don't take our word for it -- see so for yourself! Again all footage was taken *carefully* using a tripod planted firmly to the ground.



Video of laser beam which shows the convection currents at first, then pans left to zoom in onto the "non-twinkling star." Alternate [high-res](#) version.

Unlike the fine laser beam from last week, the enlarged image using the beam expander remains in the confines of its original circle; it does not meander about its center and wiggle as it returns. Why?

The hot plate inevitably heats the surrounding air, and the density of the air in the vicinity is altered. Refractions occur just as they did before when the enlarged beam enters and exits the heated air column. These refractions and attempt to -- in random in directions -- shift the image of the circle. Thus far, the physics has not changed.

But the essential difference is the *magnitude* of these translations. The enlarged beam is simply too big for the convection currents to jostle around, and therefore remains in its original area; for the "wiggling" to occur, either the beam should be made smaller (to the likes of a point), or the convection currents would have to reach ludicrous temperatures. Whatever the compromise, the ratio of size to strength-of-convection-current is too high in this situation.

But then why wasn't the answer (d); that the object would remain unaffected by the air currents? Despite all that has been said thus far, it would be patronizing to pretend that the hot air currents do not affect the expanded beam at all! Surely they do, since the video shows clearly that *something* is going on -- from the fleeting "flashes across the surface" of the circle. In other words, the heater is indeed affecting the laser beam (i.e. there is a noticeable difference), but the the object is not "wiggling" like in the case of the fine laser. Therefore the answer is somewhere between wiggling and not wiggling and is (e); other.

This is an explanation for why larger objects in the night's sky do *not* twinkle. The Earth's atmosphere, strong enough to wiggle the light from distant stars, is too feeble to refract the light of nearby planets sufficiently to translate the entire planet!

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