

Activity 12, April 17, 2009

A helium-neon laser with wavelength 633 nm (red – like you always see for demonstrations or laser pointers) has a power of 5.0 mW. It is focused by a lens so that its beam diameter is narrowed to 1266 nm (that is very small!).

(a) Calculate the intensity of the beam in the laser focus.

(b) Calculate the amplitude of the electric field in the laser focus.

(c) We now put a small, perfectly absorbing sphere in the laser focus, with a diameter that perfectly matches the diameter of the laser beam. The density of the sphere is $5.0 \times 10^3 \text{ kg/m}^3$.

Calculate the radiation pressure on the sphere:

(d) Calculate the magnitude of the acceleration that the radiation force would impart on the sphere: