Teaser Question 4

Basic Training in Condensed-Matter Physics

Erich Mueller; Due Friday, Feb 27, 2009

Vortices A rotating BEC can form a "vortex" state where every atom is in an angular momentum eigenstate with $L_z = \hbar$ along the rotation axis.

1. Give an argument for why the density on the rotation axis ($\rho(x = 0, y = 0, z)$) must vanish.

Answer:

2. In a "time-of-flight" experiment the trap is turned off and the cloud expands as it falls under the influence of gravity. Does the center of the cloud continue to have zero density? Why?

Answer: