

1. JG problem 4-10 (p. 92).
2. JG problem 4-11 (p. 92).
3. JG problem 4-12 (p. 92).
4. JG problem 4-13 (p. 93).
5. JG problem 4-14 (p. 93).
6. **Non-diffracting beams.** The spatial spectrum of a light beam (*i.e.*, the wave-vectors corresponding to the plane waves that compose the beam) is distributed uniformly on a conical surface centered around the z axis, as shown in the figure below. The cone apex angle is α .
 - 6.a) Derive the amplitude of this beam in a convenient coordinate system.
 - 6.b) Explain *qualitatively* why this beam is free of diffraction effects. [Hint: use the special shape of the beam spectrum].

