ACRHEM – Laser Primer

Assignment 4   **28-08-09**

2 weeks to submit ☺ (1 week after the submission of assg.3)

1. Try to use the trail solution $exp\left(iP + \frac{ikr^2}{2q}\right)$ in the wave equation. What do you get!?
   Is it same as what we derived in the class?

2. Solve the wave equation by the method of separation of variables. What is the outcome!?
   Solution is same or different from the one derived in the class?

3. What is *slowly varying envelope approximation*? Demonstrate this for G beam.

4. What is paraxial approximation?

5. If the G beam has a circular symmetry, then it is easy to work with $r = (x^2 + y^2)^{1/2}$.
   a. Write down the wave equation in terms of r and z.
   b. What changes have to be made in the derivation of the G beam?
   c. Write E in terms of r and z.