Çankaya University – ECE Department – ECE 635

2011 Autumn Term **25.10.2011**

Experiment 3 : Plotting and observing the changes in beams with variations in source parameters

Experiment coded in MATLAB (with file name Beamtypes.m) is given on webpage of ECE 635.

1. Copy the experiment file into the directory of your name.
2. Run the file, observe the OPs, do not record anything yet. Try to follow what is intended and what is happening
3. This m file plots the 3D intensity profiles and contour graphs of fundamental Gaussian beams at four different source sizes, i.e., $\alpha_s = 0.1,\ 1,\ 2,\ 5$ cm.
4. Source size is defined as the point where the intensity is at $\exp(-2)$ of peak intensity value of the beam. Using this definition, measure the source sizes of the four beams via the data cursor and confirm that they match the settings of $\alpha_s = 0.1,\ 1,\ 2,\ 5$ cm.
5. Assess the dependence of intensity on amplitude coefficient, wavelength and focusing parameter, i.e., $A_c,\ \lambda,\ F_s$.
6. Add the Bessel functions to this code to generate Bessel and modified Bessel Gaussian beams. Keep in mind that in MATLAB, $J_n(x)$ and $I_n(x)$ are given by besselj(n, x), besseli(n, x). Take plots from this new code and examine variations of intensity with the width parameter and the order, i.e., $a_B,\ n$.
7. Include your comments for the experiment