

High Resolution Bead Technique Measurements and Multipole Analysis, A.M. PORCELLATO,

M. CAVENAGO et al. INFN-LNL - The bead perturbation of the frequency in a resonant cavity provides accurate measurements of electrical field intensity configuration. Reducing the bead diameter to about 3 mm, to improve the accuracy, makes the measure extremely sensitive to resonator thermal drifts. A large insulated test chamber was designed and installed in our laboratory to limit the cavity temperature changes to about 0.00001 K/s. The improved thermal stability and a more stable electronic equipment allowed to improve the frequency resolution to 1 Hz in the measurement points (five rows of 256 points each) used to determine the electrical field. The data are analysed to determine the multipole components of the electrical field along the beam axis and to compare them with the results obtained by well-known codes. Practical advantages of the bead technique method, i.e. unbiasedness, sensitivity to manufacture errors and shape resolution, are discussed.