

Multipacting Tests with Magnetic Field for the LHC Beam Screen, O. BRUNING, F. CASPERS, J.-M. LAURENT, M. MORVILLO, F. RUGGIERO, CERN - In connection with electron-cloud induced heating of the LHC beam screen, multipacting tests with a resonant coaxial cavity have been successfully performed in presence of a solenoidal and a dipole magnetic field. We have developed a simple and reliable technique, based on amplitude modulation of the input signal, to detect electronically the onset of multipacting and to monitor the field and power level in the resonator. Several multipacting patterns have been systematically investigated under the effect of a variable DC-bias applied to the inner conductor of the coaxial setup. The results at room temperature are qualitatively similar to those obtained during cold tests (below 20 K in a cryostat) with a dipole magnetic field up to 7.5 T. A weak solenoidal field of about 50 Gauss is usually sufficient to stop the multipacting, but the same longitudinal field is ineffective in presence of a strong vertical dipole field (up to 1.5 T). We have also measured the rise time of the multipacting versus the intensity of the solenoidal field: a comparison with simulation results allows to validate the latter and to obtain information on the secondary electron yield of the cavity walls. Moreover, there is a substantial decrease of the multipacting threshold when the dipole magnetic field has an intensity such that the electron cyclotron frequency is equal to the resonant frequency of the coaxial cavity.