

Photoelectron Yield and Photon Reflectivity from Candidate LHC Vacuum Chamber Materials with Implications to the Vacuum Chamber Design,
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Preliminary studies of the photoelectron yield and photon reflectivity at grazing incidence (11 mrad) from candidate LHC vacuum chamber materials have been made on a dedicated beam line on the Electron-Positron Accumulator (EPA) ring at CERN. These measurements provide realistic input toward a better understanding of the electron cloud phenomena expected in the LHC. The measurements were made using synchrotron radiation with critical photon energies of 198 eV and 45 eV; the latter corresponding to that of the LHC at the design energy of 7 TeV. The test materials are mainly copper, either, i) coated by co-lamination or by electroplating onto stainless steel, or ii) bulk copper prepared by special machining. In addition, a sputter coating of Ti and Zr has been used to produce test chamber with a one micron thick TiZr getter film. The key parameters explored were the effect of surface roughness on the reflectivity and the photoelectron yield at grazing photon incidence, and the effect of magnetic field direction on the yields measured at normal photon incidence. The implications of the results on the electron cloud phenomena, and thus the LHC vacuum chamber design, will be discussed.