



TE SEMINAR

SPEAKER: Mauro Taborelli (TE-VSC)

TITLE: **LOW SECONDARY ELECTRON YIELD CARBON COATINGS FOR ELECTRON-CLOUD MITIGATION IN MODERN PARTICLE ACCELERATORS**

DATE: Thursday, 14 May 2009 14:00

PLACE: BE Auditorium – 6/2-024

ABSTRACT

Electron-cloud is one of the main limitations for future particle accelerators with positively charged beams of high intensity. The main material parameter governing the phenomenon is the Secondary Electron Yield (SEY) of the inner surface of the vacuum chamber. An ideal surface should always maintain a low SEY, the threshold for SPS with nominal LHC beam being 1.3, also after air exposure for installation of the chambers and maintenance. As a possible solution amorphous carbon coatings were produced by magnetron sputtering of graphite targets. In laboratory measurements they exhibit maximum SEY between 0.9 and 1.1 after transfer to the measuring instrument through air. After 1 month air exposure the SEY rises to values between 1.0 and 1.4 depending on the storage conditions, coating parameters and configuration.

Tests performed in the SPS on electron cloud monitors demonstrated an excellent performance. The behaviour of the carbon coating is similar to that of thermally activated TiZrV NEG, but is achieved without bake-out and is largely superior compared to stainless steel, which is the present material of the vacuum chamber surface. In 2009 three coated dipoles have been prepared and inserted in the machine in order to verify the long term behaviour of the coating in the SPS with respect to e-cloud, pressure and resistance to radiation.

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