

Surface flashover of high purity alumina during a pulsed electric field

Wednesday 6 November 2013 14:30 (3h 30m)

The LHC injection kicker magnets include beam screens to shield the ferrite yoke against the effects of the high intensity beam: the screening is provided by conductors lodged in the inner wall of a high purity alumina support tube. The alumina must have a low rate of flashover. This screening will be further improved by additional conductors; however these must not compromise the good high-voltage behaviour. Extensive studies have been carried out to better satisfy the often conflicting requirements for low beam coupling impedance, fast magnetic field rise-time, ultra-high vacuum and good high voltage behaviour. The new design will be presented together results of high voltage tests.

Significant pressure rises, due to electron-cloud, can occur in and nearby the alumina tube: the predominant gas desorbed from surfaces is hydrogen. Similarly temperature rise of the ferrite yoke can result in an increase in pressure. A series of high voltage tests are planned for the laboratory in which various gases are injected into a test tank: this will allow a careful and systematic study of the effect of pressure upon surface flashover of the ceramic tube. In addition various coatings are under investigation for further reducing surface flashover. The plans for these tests and a summary of the coatings under investigation will be presented.

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Session Classification: Poster session