

BREMSTRAHLUNG DETECTION AND CHAMBER OBSTRUCTION LOCALISATION USING SCANNING RADIATION DETECTORS

G.A. Naylor, B. Joly, D. Robinson, ESRF, Grenoble

Abstract

Radiation monitors consisting of scintillating plastic coupled to photomultipliers are used for diagnostic purposes. By scanning such a detector or a radiation scatterer, two applications are demonstrated:

- i) Monitoring of vacuum chamber conditioning by monitoring gas Bremsstrahlung from residual gas.
- ii) Localisation of beam interception (beam losses) by longitudinal scanning of a radiation detector.

The measurement of gas pressure inside long, small cross section, vacuum vessels is difficult due to the distance between the centre of the vacuum vessel and vacuum gauges (leading to a low vacuum conductance). The narrow beam of gamma Bremsstrahlung radiation is intercepted by scanning tungsten blades in the beam line front-end allowing a radiation shower to be detected outside the vacuum vessel proportional to the gas pressure in the corresponding storage ring straight section. A second detector mounted on rails can be moved over a length of 6.5m parallel to the ESRF storage ring so as to localise regions of beam loss. The location of a scraper and narrow chamber entry and exit points are clearly resolved.

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