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Diagnostics in High Intensity Beams I

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Performant beam diagnostics are essential for the successful operation of high-current accelerator facilities, to achieve its design parameters. The usage of standard and advanced beam instrumentation is reviewed. In the first part of the lecture, the methods beam current, transverse profile, and emittance are presented. Invasive diagnostics, such as screens, wire scanners, and grids, may be destroyed by the high beam power; hence, the use of non-invasive types, such as Ionisation Profile Monitors and beam-induced fluorescence, is beneficial. Given the significant non-linear effects present in high-current beams, special emphasis is placed on emittance measurement using tomographic reconstruction methods.

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