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## **Advanced diagnostics for Laser Plasma Acceleration experiments.**

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Several radiation-based diagnostics for Laser Plasma Acceleration are presently studied in laboratories around the world. Of these the most interesting seem to be the Betatron Radiation, Thomson Scattering and Radiation Transition. In the presentation will highlight the potential of these techniques together with their limits and feasibility. In particular the Betatron Radiation as tool to diagnose the acceleration length, transverse bunch size and electron energy will be taken into account. The effects of the electron acceleration, energy spread, initial space-momentum configuration on the Betatron Radiation spectra, together with the elliptical shape of the accelerating structure and the possible interaction of the electrons with the laser field will be considered. A compact analytic method for first-order fast calculations of the Betatron Radiation spectral and spatial distribution will also be provided and discussed.

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