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Numerical methods for emittance computation from luminosity

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The beam transverse emittances play a critical role in high-energy colliders. Various measurement techniques are employed to measure them. In particular, the so-called luminosity emittance scans (or Van der Meer scans) are used in order to evaluate the convoluted beam emittances. This method assumes different emittances in the two planes but identical emittances in the two beams. In this paper, we propose an approach to remove this constraint. After having presented the new measurement protocol, we will discuss its potential and limits, including the statistical measurement error of the luminosity value as obtained from numerical studies.

Footnotes

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Europe

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