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Evaluating the use of common statistical divergences to quantify the differences between beam distributions in high-dimensional phase space

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Quantifying the difference between two beam distributions in high-dimensional phase space is crucial for interpreting experimental or simulation results. This study aims to analyze and compare several common statistical divergences that quantify the differences in high-dimensional distributions, and to determine which of them are suitable for beam physics applications. We tested these divergences with common kinds of initial distributions by computing how the difference values vary when the mismatch factor and emittance change, between the same and different kinds of distributions. These results, along with similar comparisons after extended beam transport, provided guidance on the use and choice of statistical divergences for beam phase space distributions.

Footnotes

Funding Agency

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Yes

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