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Fast RF tracking functions

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The beam dynamics of a bunch both longitudinally and transversely play a major role in the design process of an RF cavity, from the feasibility of cavity lengths, to the focusing schemes required to maximise capture. Often, computer simulations track particles using computationally intensive numerical techniques, which can be extremely time-consuming to run. In this paper, we present a generalised analytical method to track macroparticles through RF structures, computing the 6D phase space elements at the end of each RF cell. The results show strong agreement with the well-benchmarked tracking code, ASTRA, however requires a significant reduction in computing power and run time. The results from this paper present a very promising means of streamlining future tracking simulations by increasing the computing efficiency with no significant detriment in accuracy.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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