IPAC'24 - 15th International Particle Accelerator Conference



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Understanding sextupole

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In this study, we reassess the dynamics within a simple accelerator lattice featuring a single degree of freedom and incorporating a sextupole magnet. In the initial segment, we revisit the H\'enon quadratic map, a representation of a general transformation with quadratic nonlinearity. In the subsequent section, we unveil that a conventional sextupole is essentially a composite structure, comprising an integrable McMillan sextupole and octupole, along with non-integrable corrections of higher orders. This fresh perspective sheds light on the fundamental nature of the sextupole magnet, providing a more nuanced understanding of its far-from-trivial chaotic dynamics. Importantly, it enables the description of driving terms of the second and third orders and introduces associated nonlinear Courant-Snyder invariant.

Footnotes

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North America

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