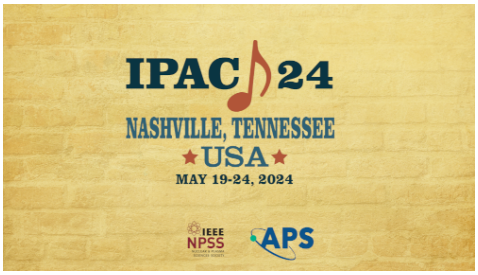


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# Change of Hamiltonian during longitudinal separatrix crossing

*Monday, 20 May 2024 16:00 (2 hours)*

Near-adiabatic capture into an RF bucket with rising voltage has been used since 1946 or earlier. But until the present work, there is no analytic and deterministic description of the process capable of predicting the final phase space distribution (for arbitrary voltage ramps). Recently, we have developed formulae for trajectories that cross the instantaneous separatrix, and the corresponding change of Hamiltonian. Previous attempts at this calculation were unsatisfactory: either plagued by singularities, or limited to probabilistic results for linear variation of the confining potential. Previously*, we presented formulae for the changes in Hamiltonian (due to modulation and bunching) before and after separatrix crossing; and those contributions to emittance growth are equally or more important. Together, the three results provide a complete, analytic description of near-adiabatic capture into an RF bucket.

## Footnotes

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North America

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