

Self-Consistent Transfer Maps for High Intensity Beams

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Transfer maps methods, especially Differential Algebra-based Taylor maps, have become ubiquitous in beam and accelerator physics over the past two decades. When combined with normal form methods, they allow the extraction of relevant system information, offer insights, and in general permit detailed analysis of particle beam behavior. In the case of high intensity beams, where space charge plays a significant role, the situation becomes more complicated. This talk will present novel methods that allow the self-consistent extraction of Taylor maps for space charge dominated beams with almost the same ease as afforded by single particle methods.