Cornell University
Laboratory for Elementary-Particle Physics

Heuristic Study of the Effect of Chromatic Nonlinearities on BBU Instability Thresholds

Initial investigation with the toy lattice used in Hoffstaetter and Bazarov, PRST-AB 7, 054401 (2004)

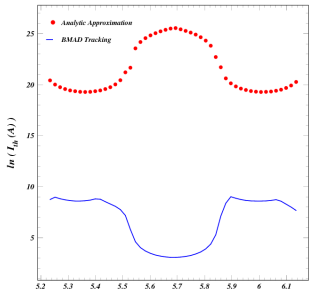
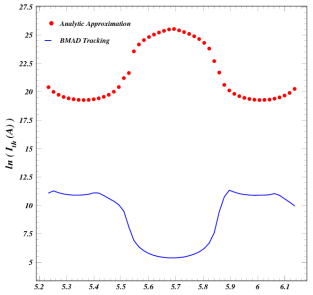
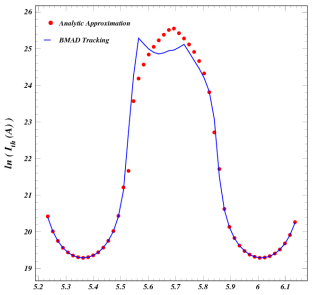
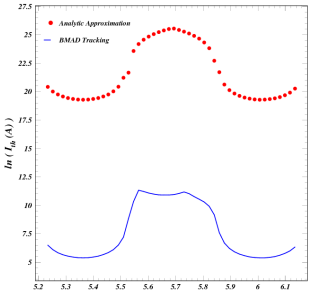
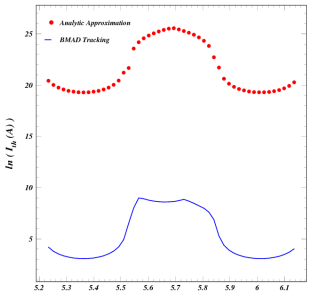
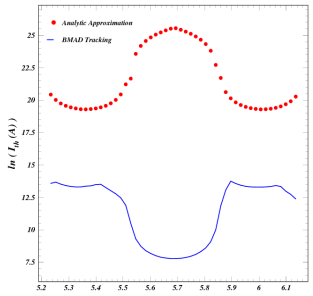
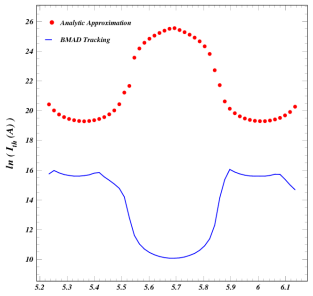
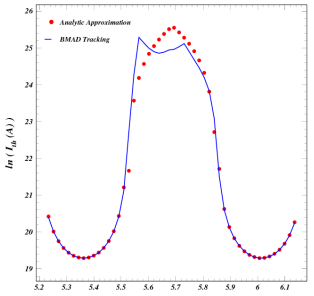
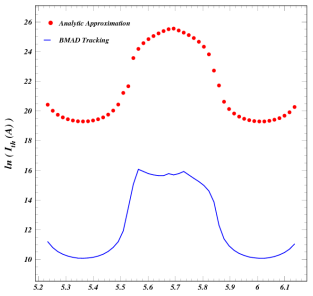
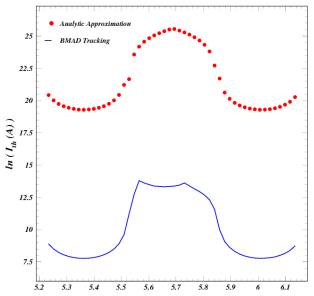
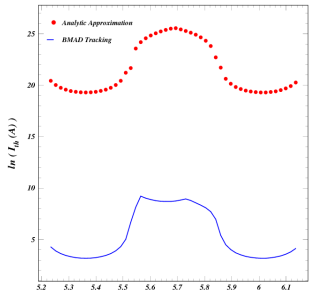
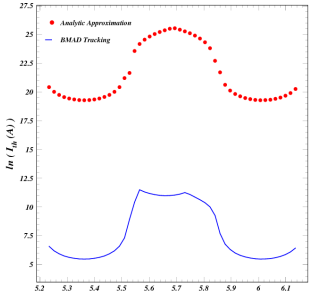
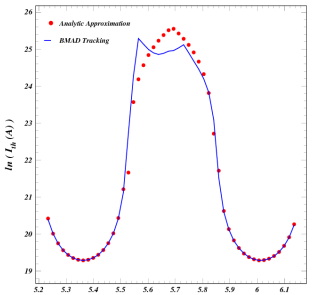
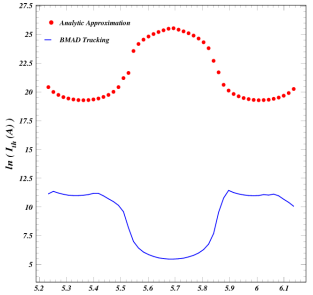
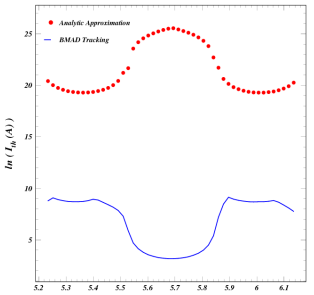
$$X_i^{(N+1)} = R_{ij} X_j^{(N)} + M_{ijk} X_j^{(N)} X_k^{(N)} \qquad i, j, k=1\text{-}6$$

Introduce nonzero M_{116} M_{226} M_{126} to see how particle energy offsets affect the instability threshold calculation

Jim Crittenden
Cornell Laboratory for Accelerator-Based Sciences and Education
ERL@CESR Meeting
29 March 2012

Dependence on Energy and Magnitudes of Nonlinear Transfer Elements

$$M_{116} = M_{226} = M_{126}$$

ΔE/E	-10k	-1k	0	1k	10k
-1e-3					
0					
1e-3					

Ratio of Return Time to Bunch Spacing