

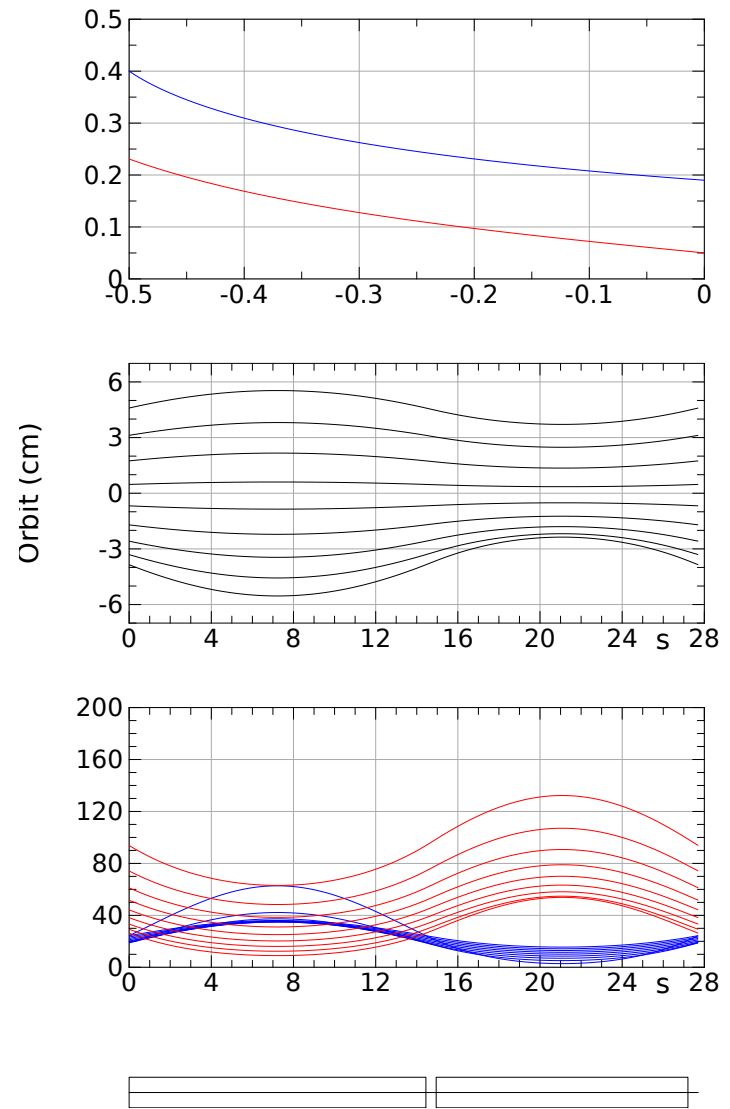
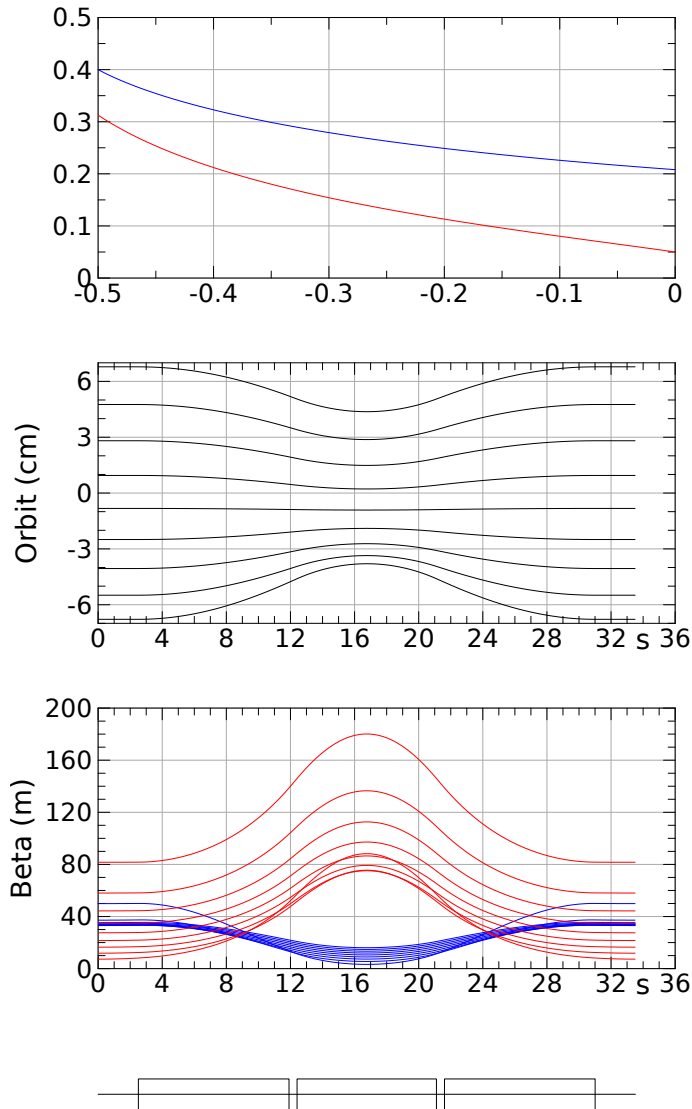
Compact Arc and Transition to Long Straights for High Energy Muon Acceleration

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- FFA accelerating to high energy
- Fields were high (not addressed here)
- Aperture in RF larger than desirable
- Short drifts make extraction (septum) challenging

With Drift

No Drift



2.5–5 TeV Values

	With Drift	No drift
Coil Field (T)	18.01	15.36
Beam Field (T)	14.35	11.62
Beam Width (mm)	139	113

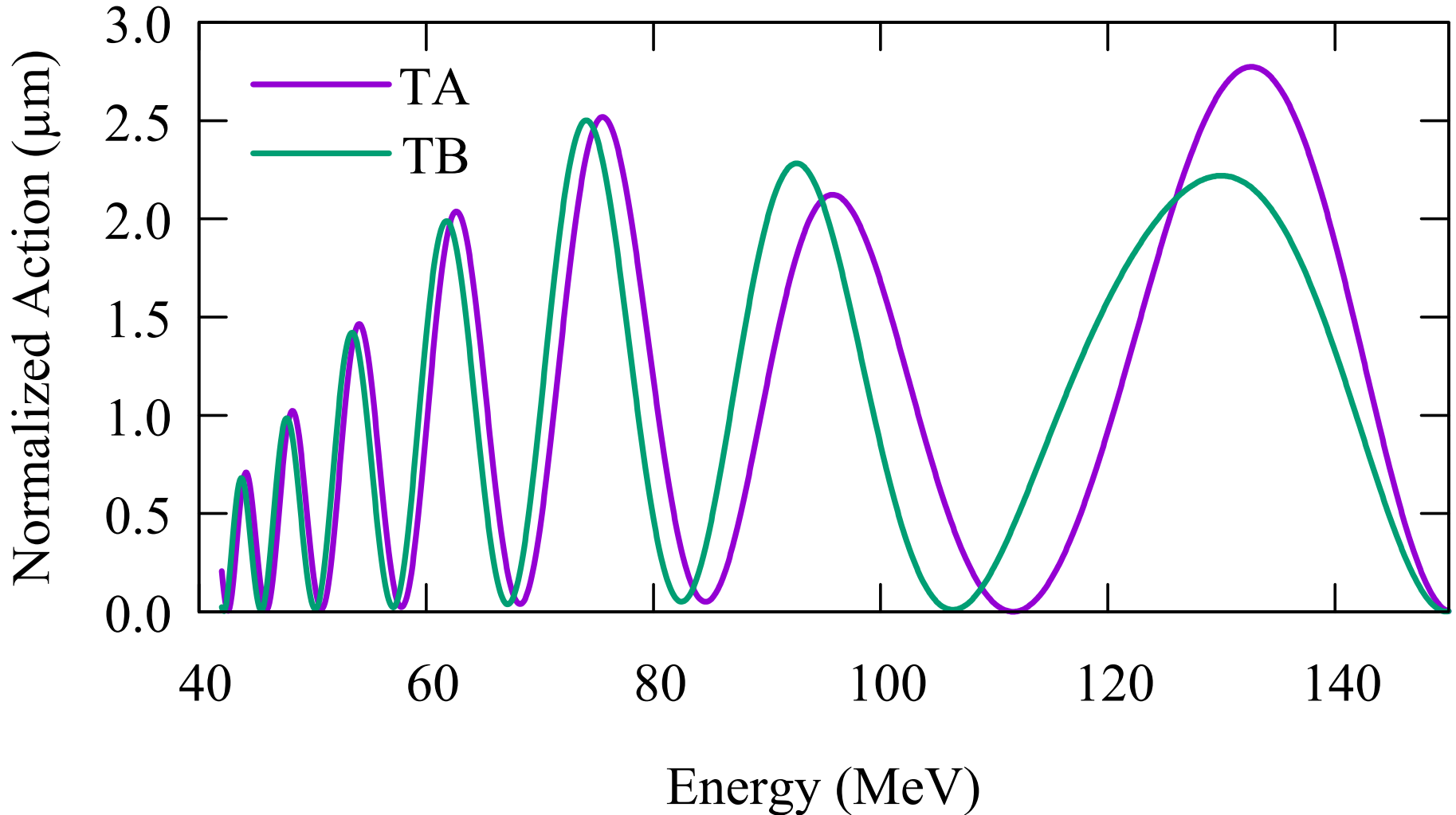
- Note: assumes same radius!
- Adding long straights would require reduction in arc radius

CBETA Taper

- 24 cell taper from arc to straight
- Arc/straight cell lengths similar
- Average bend angle is half of arc



Mismatch vs. Energy

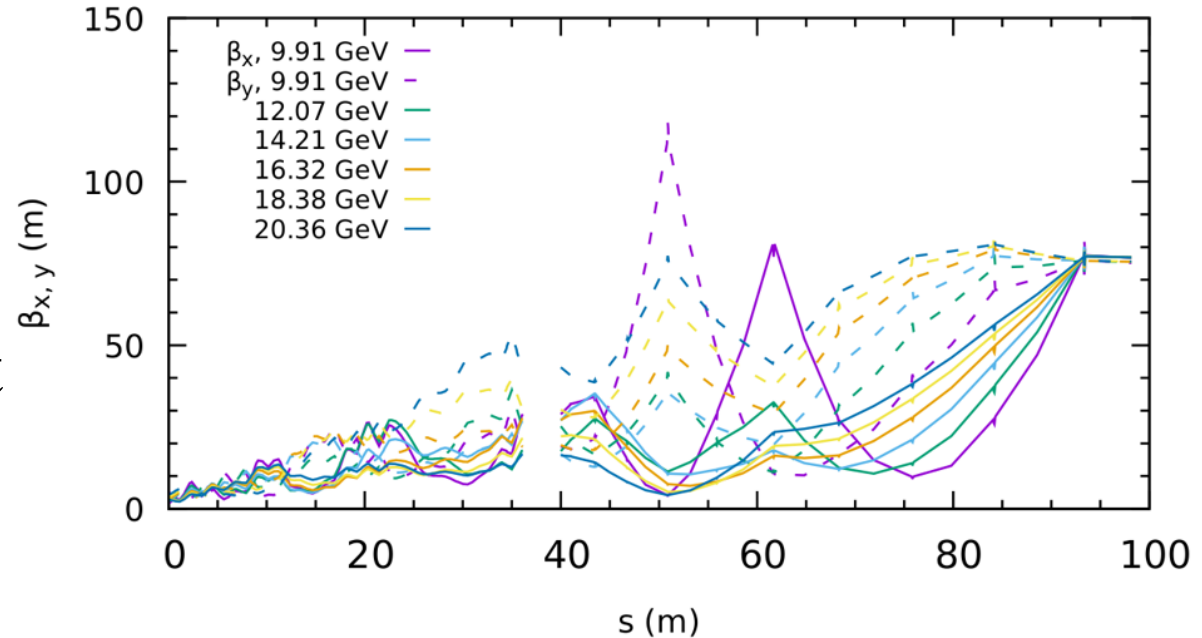


- Can tune to get 4 design energies exact

Transition to Long Straight

- Need to taper to increase cell length
 - Transition gets even longer
 - Average bend angle even lower

- Attempted for CEBAF upgrade
 - Very long
 - Matches weren't very smooth
 - V. Morozov



- Needs to be good for around 50 energies
 - Cannot tolerate emittance growth

- First, this is all speculative, need to check by trying
- Removing drift from arc only helps fields and apertures by $\approx 20\%$
 - Assumption of same radius probably wrong
- Transition to long straight has problems
 - Low average bend field
 - Difficult to get good match at all energies: would require many cells
- Some ideas
 - Add nonlinearity, see if it helps
 - Force drifts longer, see how bad the penalty is
 - Elliptic, for moderately longer cells
 - DFD, more complex cells (but: half integer resonance)