

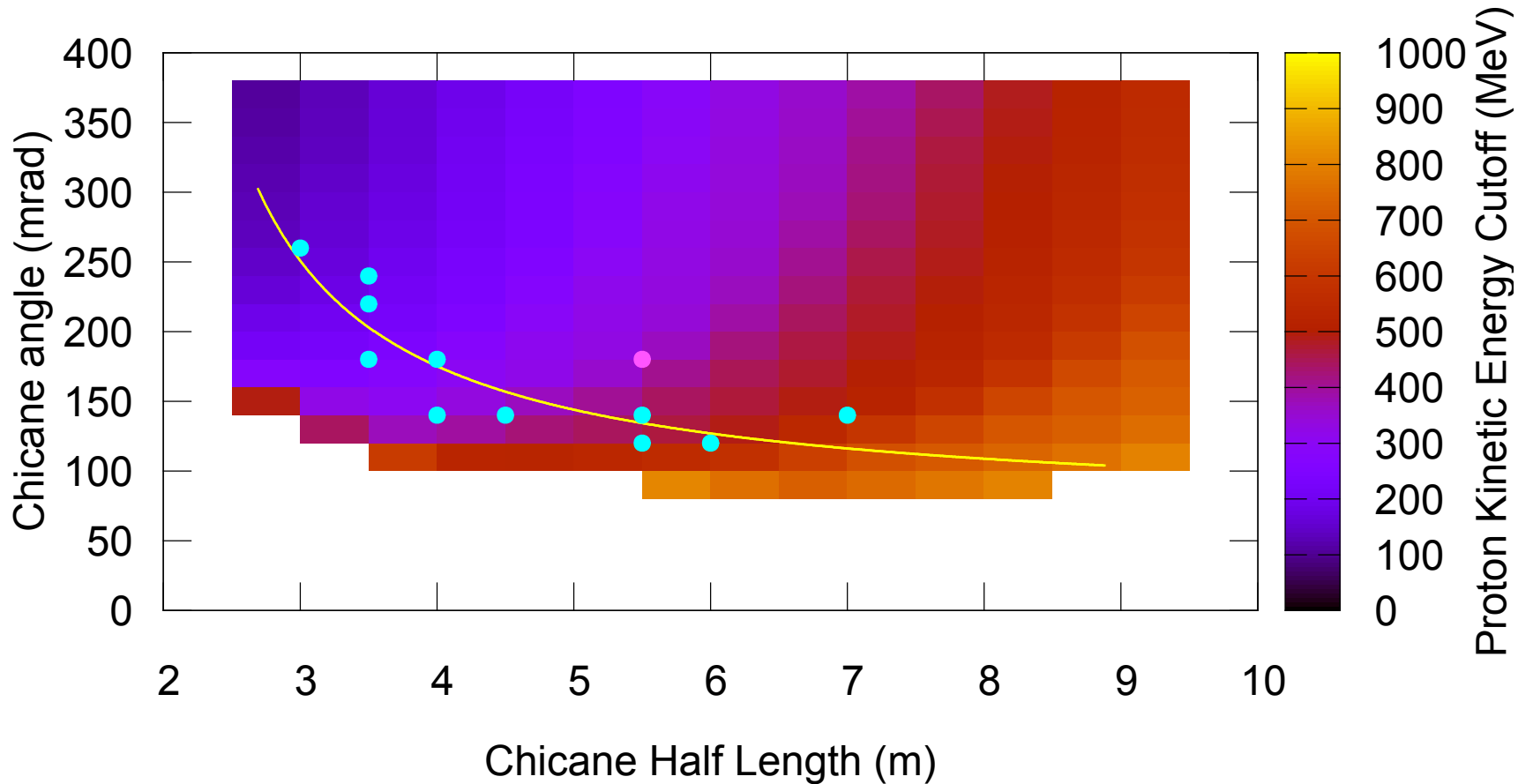
Front End Chicane Test Optimum Parameters

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- Goal: optimize chicane parameters for high energy cutoff
- Not dealing with absorber for low energy protons
- Chicane field is 2 T
 - Could be done for other fields
- 25 cm radius aperture downstream of chicane
 - No aperture in chicane

- Scanned chicane angle and length
- Two performance parameters
 - Maximum proton energy
 - Allow 2 W of protons above this energy per input MW
 - Muon transmission from 80 to 260 MeV kinetic energy
- Found function for chicane parameters vs. maximum proton energy
 - Fit to results with best muon transmission

Cutoff vs. Length and Angle



- Fit angle and length vs. proton energy cutoff for optimal solutions
 - Best muon transmission for a given proton energy cutoff
 - Ignore single outlier

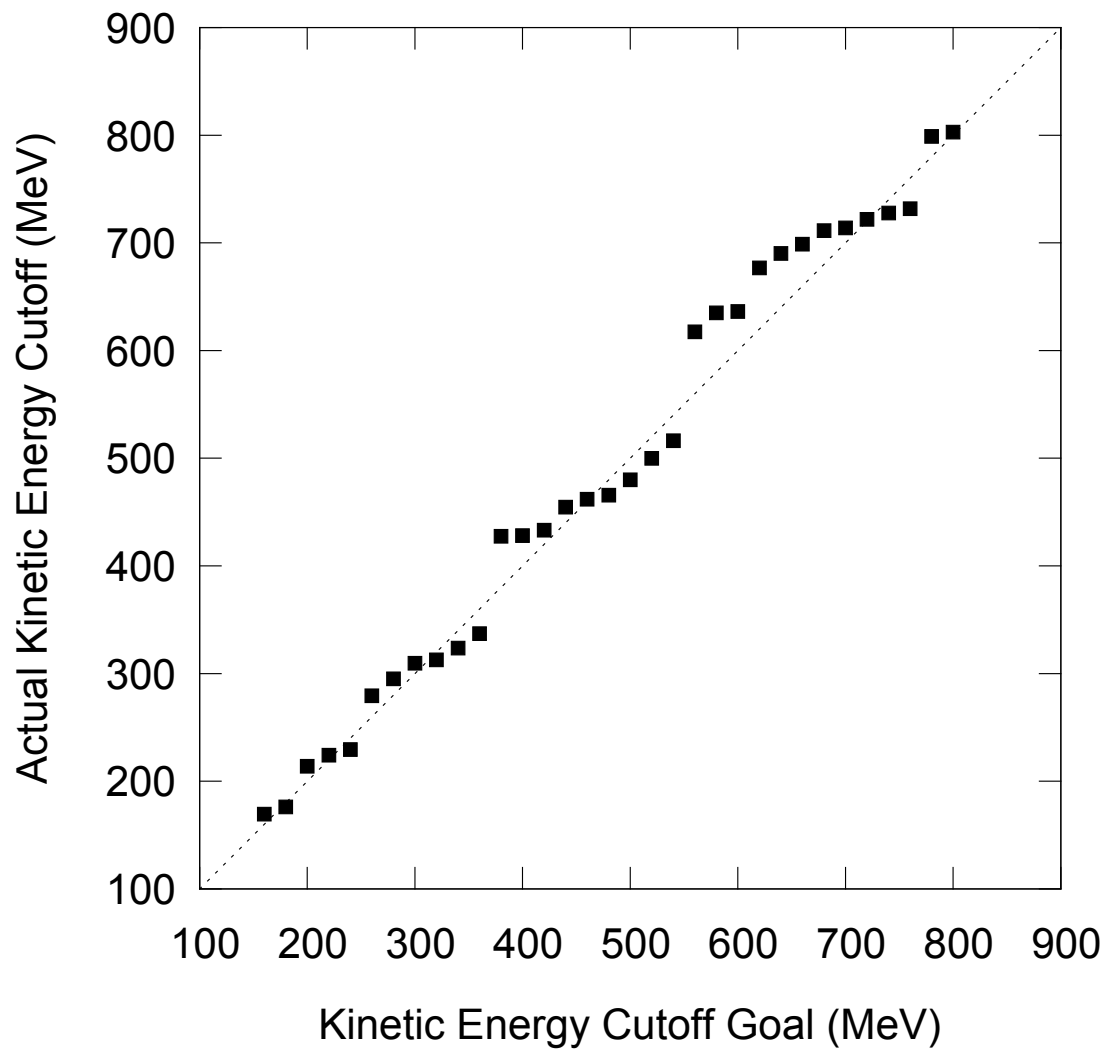
$$L = L_0 + L_1 K \qquad \theta = \theta_0 + \theta_1 / K$$

L_0 (m)	1.6	L_1 (m/GeV)	9.1
θ_0 (mrad)	69	θ_1 (mrad GeV)	28

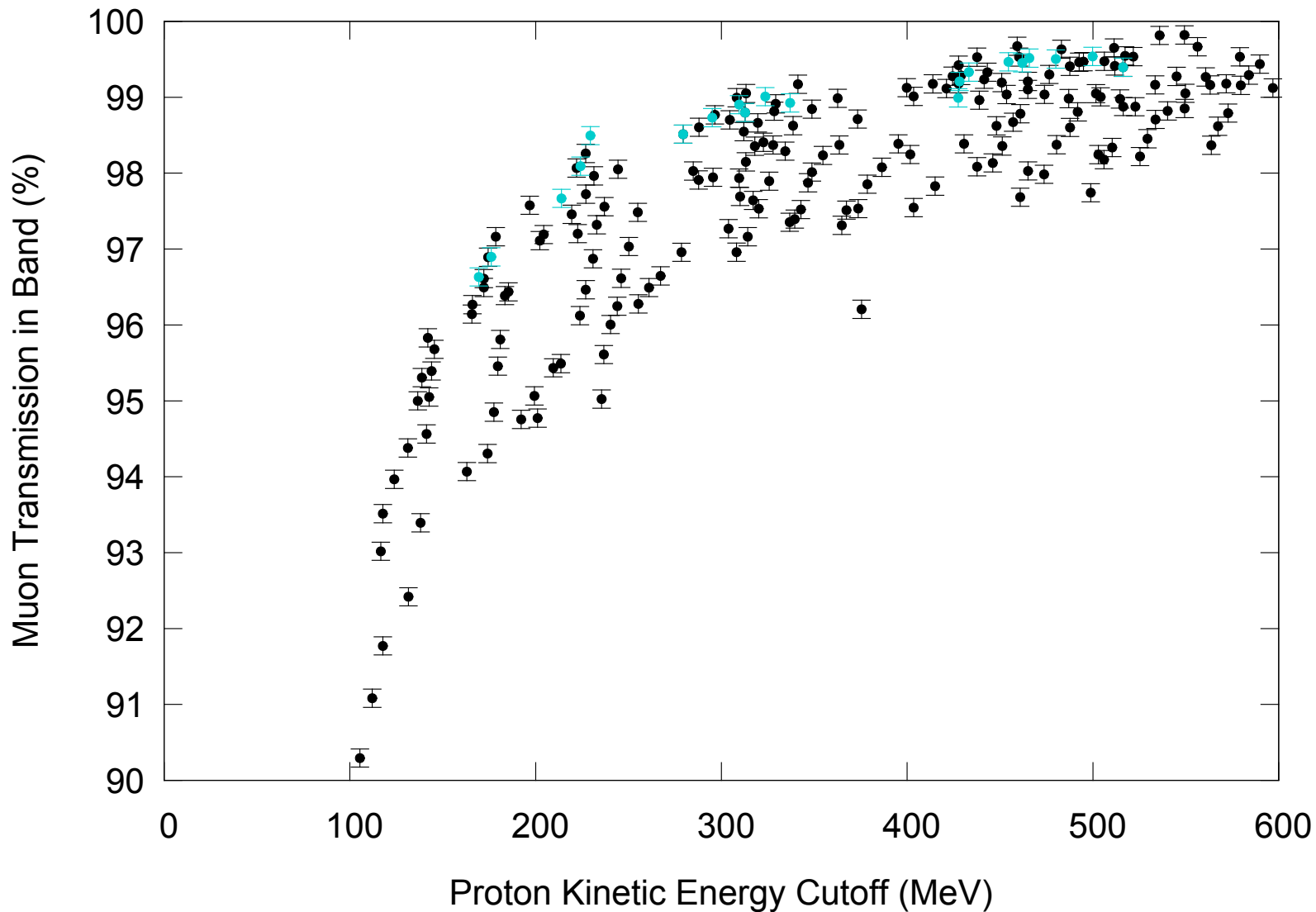
- No physical meaning to these fits

- Do a number of runs with different cutoffs
 - 120 MeV to 800 MeV, 20 MeV steps
 - Rounded angle to 10 mrad, length to 10 cm
- Compare actual cutoff to desired cutoff
 - Choppy, probably due to rounding
 - Doing a run now rounding angle to 1 mrad, length to 1 cm
- Verified that muon transmission is good

Predicted vs. Actual Cutoff



Muon Transmission vs. Cutoff



- Have a solution for chicane parameters for a given proton kinetic energy cutoff
- Produce distributions at the end of the chicane
- Drift in G4beamline with absorber at two positions
 - At end of chicane
 - At distance where all pions are decayed
 - Optimize absorber thickness for both cases
- Pass to ICOOL to optimize NBPR
 - Still a function of cutoff
 - Additionally two positions for absorber
- Pick best solution, global optimize in G4beamline
- Repeat for different chicane fields