

FFAG Lattice for 200 MeV Muons with Negative Momentum Compaction

J. Scott Berg
Brookhaven National Laboratory
Advanced Accelerator Group Meeting
2 March 2006

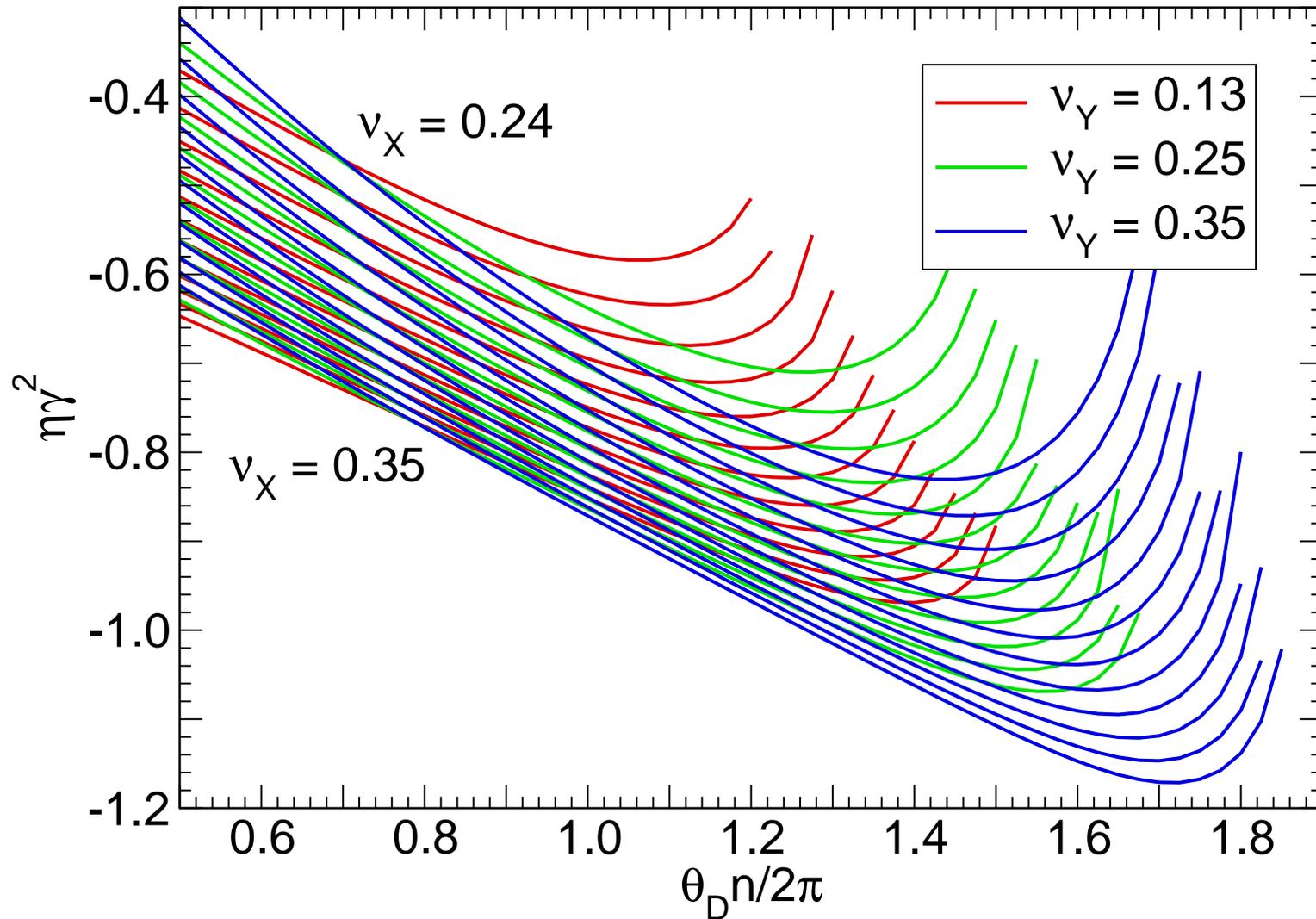
Introduction

- Have beam with an energy spread
- Want to increase the rate at which time spreads out
- Straight lattice: $\eta = dT/T/(dp/p) = -1/\gamma^2$
- Would like to double that

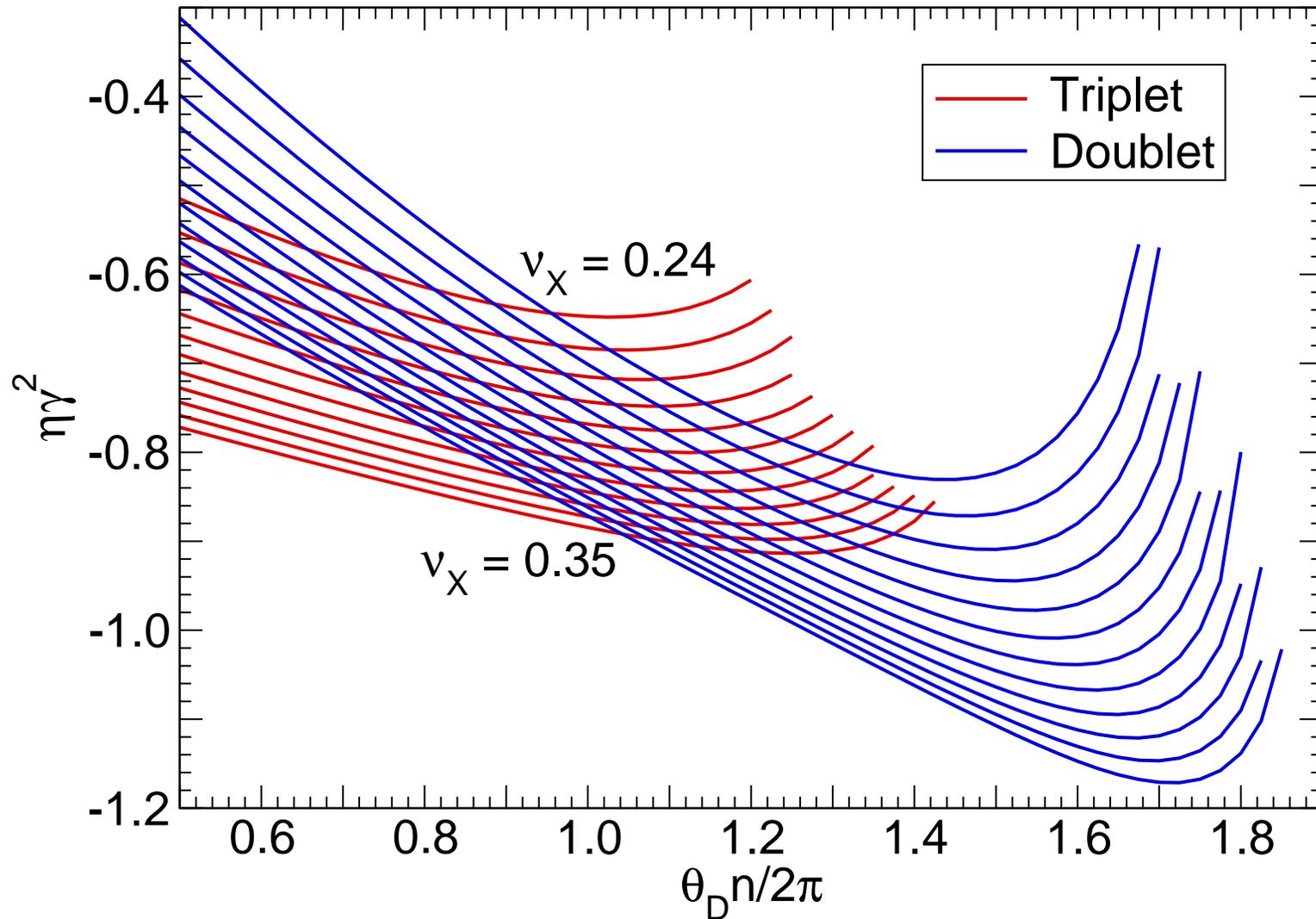
Methods

- Bob's first idea: scaling FFAG
 - ◆ Infinite energy acceptance
 - ◆ $\alpha_C = \eta + 1/\gamma^2 = 1/1 + k$, so choose $k = -4$
 - ★ $B = B_0(\theta)(r/r_0)^k$
 - ★ Thus, higher energy orbits inside lower energy ones
 - ◆ I couldn't find a working lattice
- Instead, try non-scaling FFAG: we know we can get $\alpha_C < 0$

Frequency Slip for Different Tunes



Frequency Slip for Different Lattice Types



Observations

- Any improvement in η requires high tunes
 - ◆ Will limit energy range
 - ◆ Probably won't work ($\pm 25\%$) at high tunes (0.35)
- Doublet better than triplet
 - ◆ Probably because it tends to reduce dispersion
 - ◆ Maybe try DFD triplet?
- Bob's idea: kill the drifts for cavities, maybe even make a straight chicane