

Characteristics of Optimum-Cost Lattices

J. Scott Berg

FFAG Video Conference

9 March 2004

- Fix low-energy tunes, height of time-of-flight parabola
- Minimize cost according to Palmer's formula

E_{\min} (GeV)	5		10	
E_{\max} (GeV)	10		20	
$V/\omega\Delta T\Delta E$	1/8		1/12	
n	90		105	
C (m)	606.918		767.953	
V total (MV)	675.0		787.5	
Cost (PB)	84.5		104.1	
	QD	QF	QD	QF
L (m)	1.612338	1.065600	1.762347	1.275747
r (cm)	14.0916	15.2628	10.3756	12.6256
B_{pole} (T)	2.94697	1.60491	4.30907	2.18390

- Pole tip fields end up relatively low
 - ◆ Reduced at lower energies
 - ◆ Short, high-field magnets are pricey
 - ★ Increasing length decreases field factor significantly
 - ★ Increasing length does little to geometric factor when short
 - ◆ F lower than D
 - ★ F is shorter magnet, since split triplet
 - ★ Lower dipole component in F
- Lower energy FFAG not much cheaper than higher energy
 - ◆ Magnet apertures higher for lower energy
 - ◆ Larger $V/(\omega\Delta T\Delta E)$ at lower energy (scaling)
 - ★ V must increase, or ΔT must decrease
 - ★ Note factor of ΔE in denominator
 - ★ ΔT lower or V higher means more cells