Acceptance Issues for the ILC Damping Rings

Future Plan

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The 2nd ILC workshop at Snowmass

Summary of Dynamic Aperture Study

with Multipole Errors and Single-mode Wigglers

NAME	C (km)	E (Gev)	σ_z (mm)	DA (σ_{inj}) δ=0%	DA (σ_{inj}) δ=0.5%	DA (σ_{inj}) δ=1.0%	<DA> (σ_{inj})
OTW	3	5	6	4.51	3.19	1.68	3.13
PPA	3	5	6	7.65	6.57	4.05	6.09
OCS	6	5	6	5.25	4.74	4.40	4.80
BRU	6	3.74	9	4.21	3.76	2.59	3.52
TESLA	17	5	6	3.62	2.11	1.11	2.28
MCH	16	5	9	4.58	4.01	2.66	3.75
DAS	17	5	6	4.89	3.38	2.40	3.55

Statement of Tasks

- Determine dynamic aperture of the lattices
  - **Specification of multipole errors (Cai, July 1)**
  - **Frequency analysis (Wolski, Xiao, July 15)**
  - **Ideal lattices & linear wigglers (Ohnishi, Urban, July 15)**
  - **Lattice with multipole errors & single-mode wigglers (Urban, Ohnishi, July 15)**
  - Benchmark wiggler codes (Venturini, Wan, Dragt, **September 15**)
  - Lattice with multipole errors and full nonlinear wigglers (**Urban**, Cai, August 15, **October 15**)
  - Lattice with alignment errors, multipole errors, and full nonlinear wigglers (Ohnishi, Borland, October 1, **October 15**)
- Determine the injection efficiency and beam loss
  - Define physical apertures (Wolski, Guiducci, August 1, **September 1**)
  - Realistic positron distribution & without physical aperture (Reichel, Xiao, August 15, **October 15**)
  - Realistic positron distribution, physical apertures, multipole errors, nonlinear wigglers (Guiducci, Emery, September 1, **October 15**)

Results can be found at Wolski's website: http://www.desy.de/~awolski/ILCDR

Discussion of Recommendation From Task Force 1

- Based on what we have learned so far
- Pick 6 km ring with “circular” shape
  - more symmetric
  - better chromatic property, large moment aperture
  - large dynamic aperture with multipole errors and wigglers
  - More space in arcs, potentially leads more flexible lattice, emittance, momentum compaction factor, bunch length
- Not yet to recommend any particular type of cell because we would like to have a lattice that achieve the maximum flexibility.

Optimize Dogbone Lattices

- Tune scan for all lattices
- Make TESLA lattice to s-shape and round coupling bump
- Chromatic matching (DAS)
- Chromatic correction in straights
- Optimize the energy from 4 Gev to 7 Gev?
- Extend OCS cell to dogbone
- same the wiggler model including ends