

Strawman BCD and the Road Towards RDR

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ILC-Asia Video Meeting, Nov.24.2005

GDE Executive Committee meeting on Nov.17-18 at SLAC discussed about

- BCD

Strawman BCD is now ready at

http://www.linearcollider.org/wiki/doku.php?id=bcd:bcd_home

- GDE organization issues
- Organization for writing RDR

Task Forces

- Task forces have been created for the 5 problems for which the Snowmass WS did not come to conclusions or for which some more considerations were thought to be needed.
- They have written 'white papers' by Nov.16

The problems are

- **Positron source**
(intensity of 'keep-alive source' and location of undulator)
- **Energy upgrade path**
(1TeV tunnel or 500GeV tunnel in the first stage)
- **Tunnel curvature**
(laser-straight or kinked or curved along earth's curvature)
- **Number of IPs** (interaction points)
- **Number of tunnels** (2 or 1)

Positron Source

Snowmass

- No conclusion on 'keep-alive source' (or 1% source)
- Undulator at linac end (500GeV and 1TeV stages)

White paper (Exec Com adopted this)

- Intensity of 'keep-alive source' $\gtrsim 10\%$ (BPM should work)
- Undulator at 150GeV (deceleration needed if $E_{CM} < 300\text{GeV}$), because the luminosity for $200\text{GeV} < E_{CM} < 300\text{GeV}$ is lower if linac end

This is the only white paper which gave a result different from Snowmass

Energy Upgrade Path

Snowmass and white paper came to the same conclusion

- Build 1TeV tunnel and fill the first half with linac in 500GeV stage. A horizontal line representing a tunnel. The left half is a solid green rectangle. A blue 'x' is at the midpoint. The right half is a white rectangle with a black border.

But Exec Com concluded

- Build only 500GeV tunnel in 500GeV stage because of lower 1st stage cost. A horizontal line representing a tunnel. The entire length is a solid green rectangle. A blue 'x' is at the midpoint.

in spite

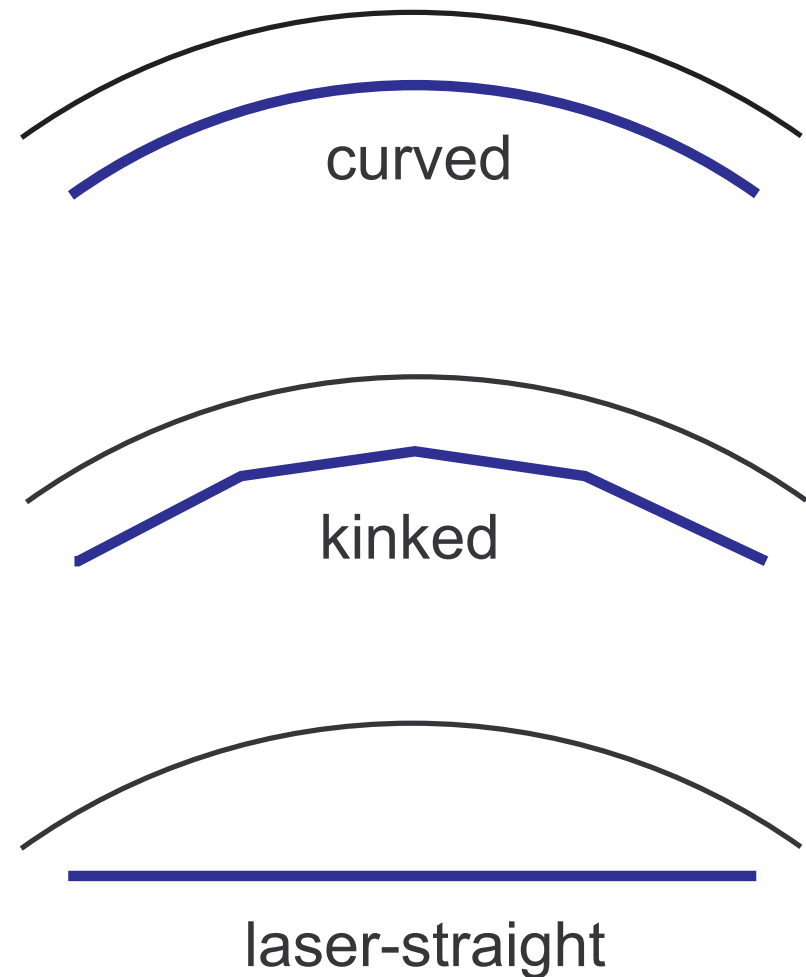
- The total cost would be a little higher
- Some of the injector lines (turn-around, spin rotator, bunch compressor, undulator?) have to be moved at upgrade

Personal opinion

- A big chance of no 2nd stage!
- 1st stage energy has to be seriously discussed. 400GeV? (physics!)

Tunnel Curvature

- **Snowmass** : no consistent conclusion
 - WG1 prefers 'laser-straight'
 - Cryogenics prefers 'kinked' or 'curved'
- **White paper** says 'curved' is preferred because of lower cost, provided no site constraint.
 - All 3 are feasible after some R&D
 - 'laser-straight' requires extra cost for cryogenics system
 - 'kinked' requires extra cost for bending sections
- **Exec Com** agrees with 'curved'



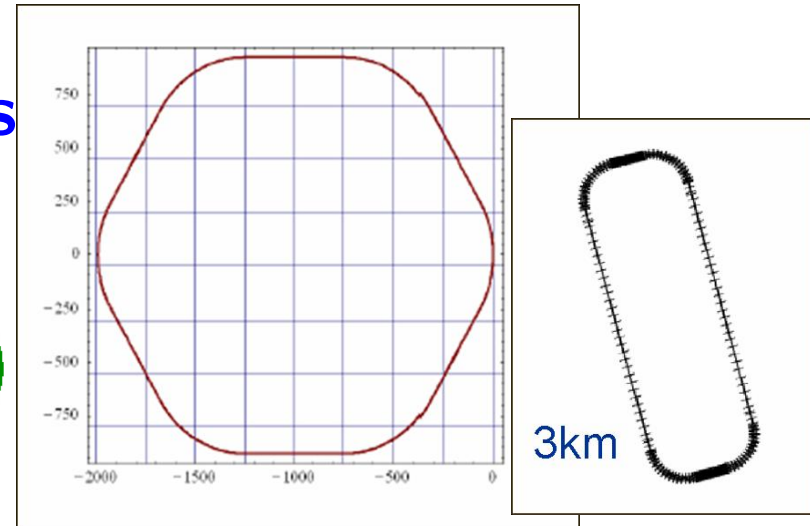
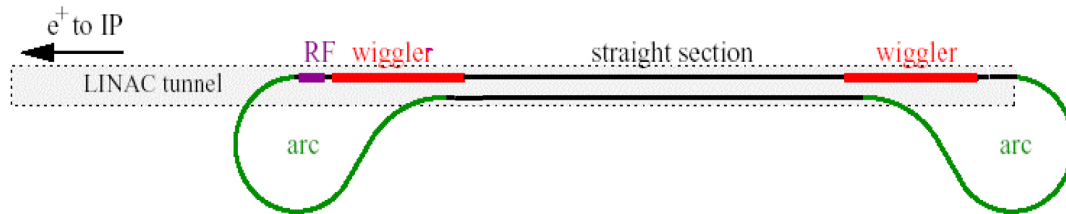
Number of IPs

- Both [Snowmass](#) and [white paper](#) say 2 IPs and 2 detectors
- [White paper](#) says the cost of 2nd IP (beamline + exp.hall) corresponds to the energy 15-19% of 500GeV.
- [Exec Com](#) adopts this but may go to 1IP in the near future so that WG4 must be prepared to respond quickly

Number of Tunnels

- Both [Snowmass](#) and [white paper](#) prefer **2 tunnels**
- [Exec Com](#) agrees

Other Issues : Damping Rings



White paper (Workshop on Nov.9-11 at CERN)

- One 6km ring for e^- and two 6km ring for e^+
- mainly because dynamic aperture of 17km dogbone is smaller
- Cost is similar to two 17km dogbone

Exec Com

- Accept for the moment after a long discussion
 - White paper choice does not guarantee Low Q (6000 bunches)
 - Dynamic aperture may be cured by longer undulator
 - Collective phenomena more serious esp. in 6km e^- ring
- May be a topic for Frascati and CCB (Change Control Board)

Bunch Compressor

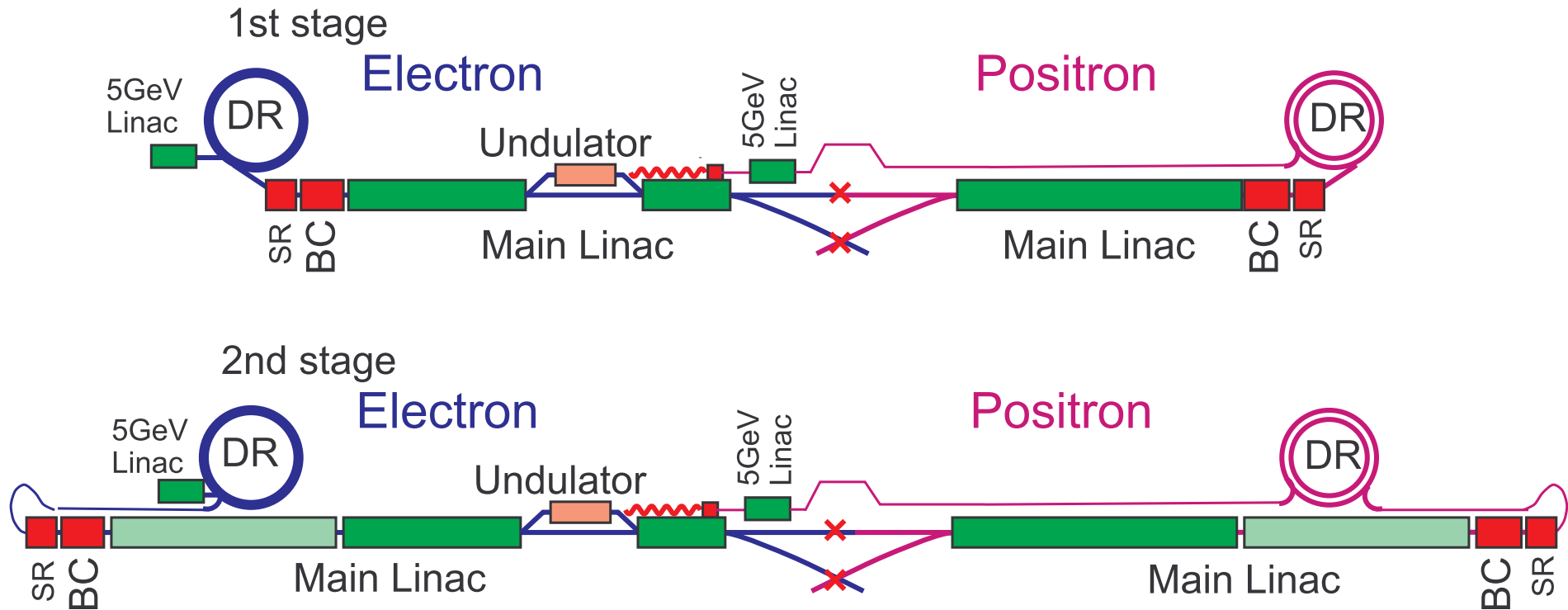
Snowmass

- Recommend 2-stage compressor of 1.4km long as baseline
- 1-stage satisfies only 6mm DR bunch → 300 μ m linac bunch

Exec Com

- Accept this
- But ask WG1 to persue shorter 2-stage compressor more intensively

Strawman BCD Layout



These figures are not intended to define

- Location of 5GeV linacs (e^+ and e^-)
- Location of 2nd stage undulator (must move to 150GeV point?)
- Linac orientation (2 linacs may have an angle)

GDE Organization Issues

- Increase GDE members
 - 4 from US and 4 from Japan proposed
 - None from Europe (may propose later)
 - To be officially decided at Frascati
- Subgroups of GDE (The chairs will be decided soon.)
 - CCB (Change Control Board)
 - R&D Board for priority assignment of R&D
 - DCB (Design-Cost Board)

Organization for writing RDR : RDR Matrix

	Area Systems					
	e ⁻ source	e ⁺ source	Damping Ring	RTML	Main Linac	BDS
Technical Systems						
Vacuum systems						
Magnet systems						
Cryomodule						
Cavity Package						
RF Power						
Instrumentation						
Dumps and Collimators						
Global Systems						
Accelerator Physics						
Commissioning, Operations & Reliability						
Control System						
Cryogenics						
CF&S						
Installation						

RTML: Ring To Main Linac

CF&S: Conventional Facility and Siting

- **Area Systems** are similar to the present WGs but more emphasis on editing skill
- **Technical Systems** distribute over Area Systems.
- The table of contents of RDR would be
 - Chapters of Area Systems under which sections of Technical Systems
 - Chapters of Global Systems
- GDE EC is trying to nominate the 2-3 leaders of the Systems (but not the cells)

Frascati GDE Meeting

- Dec.9-11 at Frascati after TTC (TESLA Collaboration Mtg. Dec.7-9)
- Mission
 - Final decision on BCD
 - How to proceed towards the RDR
- Program being discussed