



SB2009 Estimate Needs

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Main Linac: 1 tunnel, Low Power,

Klystron Cluster, DRFS, 1 stage BC

RTML: 1 stage BC, (Low Power is too tiny of a gain)

Damping Rings: $C = 6.48 \Rightarrow 3.24$ km

Beam Delivery System: travelling focus to preserve \mathcal{L}

Central Complex: still developing concepts

Major impacts on Conventional Facilities! \Rightarrow see Vic



“adjustments” since RDR?

- Correct many minor errors = ≤ 1 M ILCU !
- CFS has calculated reduced volume of Amercias shaft base caverns, but not removed from est yet
- e⁻ bypass around undulator? not in ML nor e⁺
Ewan says not part of new Central Complex
- Doesn't include any “timing drift”
Ewan says not necessary, but Marc adds that same “gap” for undulator is included in e⁻ ML need components: vacuum, quads, instrum.
- CFS had removed Chilled Water System from August 2008 Klystron Cluster Study
(not yet removed from RDR estimate total yet)



what is “starting point” for comparisons?

- These two items were adopted as part of baseline since RDR, but **not** included in any updated cost estimate:
 - **6+ => 3+ km Circumference DR**
 - **2 stage => 1 stage Bunch Compressor for RTML**
- Proposal is to do “adjustments” from last page as “starting point” and then show estimates for shorter DR and 1 stage Bunch Compressors
- And then show the estimates for the 1 tunnel ML and Low-P (both for Klystron Cluster and DRFS)



RTML – Solyak – DESY – May 09

- Change from RDR 2 stage => 1 stage Bunch Compressor

Components	2 stage BC		1 stage BC		Low-P	
	RTML	ML	RTML	ML	RTML	ML
8C1Q Cryomodules	36	560	12	584	12	584
9C0Q Cryomodules	<u>60</u>	<u>1120</u>	<u>0</u>	<u>1168</u>	<u>0</u>	<u>1168</u>
8C1Q + 9C0Q CMs	96	1680	12	1752	12	1752
Total RTML + ML CM	1776			1764		1764 $\delta = -12$
RF units	34	560	4	584	4(2?)	292
total # RF units	594		592		296	(294?)

- Change # quadrupoles, add **new** wigglers, reduce # dumps, reduce total length of tunnels (actually transfer some to ML),
are the sizes and unit costs of components the same?

- <http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=3526>



Damping Ring – 28july 09

Susanna Guiducci

- 6476 m => 3238 m circumference
- Is there any low-P impact?
half-C & half # bunches => same stored current
- CFS has geometry - what about power, cooling?
- half number RF cavities, half number wigglers
- Other component counts? Dipoles, quads?
- Do sizes, performance, unit costs change?
- Cryogenics impact?
- I'm expecting a new full cost spreadsheet
for technical elements from Susanna



Single Tunnel and Low Power Option for Main Linac (only)

- Don't impact e⁺/e⁻ Sources or RTML beyond ML
- 1/2 number of bunches, same beam pulse length (**not** Chris A's same bunch spacing w/ shorter pulse)
- Install 1/2 # RF drivers (~ 33% higher-E modulators)
- Require estimates for both Klystron Cluster & DRFS
- New or updated component estimates for:
300 MW waveguide pipe & coaxial in/out couplers
may be incl'd in Chris' 20july09 – need breakdown
DRFS has component counts & unit costs as
presented by Shigeki Fukuda-san on 15july09
- Does CFS have all Power, Cooling, Space req's?



PHG Low-P questions from 15july09

- Information still needed (by PHG):
 - Updated estimates for over-moded waveguide and couplers for Klystron Cluster Study
 - Understand cost impact on cryo-plants (mostly dynamics loss, RF pulse length driven: see presentation from Chris Adolphsen. But this was not distributed!)
 - Which of the two low-p DRFS options to chose?
 - Better developed DRFS cost estimates
 - How do CFS estimates scale for low-power option?
 - Do we need to change to a larger tunnel diameter because of single-tunnel solution?

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- I'll send this list of questions/outstanding items to Nikolay, Susanna, Shigeki, Chris, & Ewan
- Send backup cryo load info to Tom Peterson
- Andrei Seryi adds: don't forget the extra costs for travelling focus (Andrei already provided estimate of ~ 1.5 x cost for crab cavities and its associated cryogenics – this is sufficient, but Andrei is invited to submit a more developed or detailed estimate, if available)
- Marc Ross wants Nick Walker to verify the split point for the RTML-ML boundary