

US Contributions to ILC Accelerator - SLAC -

Americas Workshop on Linear Colliders
October 20, 2020

Overview of potential SLAC ILC contributions

- For ILC250, SLAC could contribute 60-70 **HTRF system units**.
 - The relevant personnel are still at SLAC and are interested in the project.
- **A CM testing facility** (owned by OBES) is foreseen for SLAC and ILC could possibly benefit from this.
- SLAC can also make **intellectual contributions** in other key areas
 - Beam Delivery Systems
 - Experience in BDS design & FFS
 - e.g. contributed design, operations & hardware to ATF2 program
 - Many participating personnel still at SLAC
 - Beam physics
 - Considerable experience in electron injectors, Linac and ring operations

LCLS-II → large scale deployment of ILC technology

e.g. Cavity / Cryomodule:

- Cost Validation : **few percent scale**
- Cost Reduction
 - Applied production balanced against continued R&D
 - From C100 (JLab) to EXFEL: **factor 2 cavity cost reduction**
- Technical Risk Mitigation
 - **Demonstrate construction and performance** of ILC-type cryomodules for science in the US

For US, the work on ILC and now on LCLS II has brought together SRF programs in a way that maximizes collaboration, efficient sharing of IP, and facilities giving the most “bang for the buck”.

LCLS-II Cryogenic System: (ILC Technologies)

Component	Count	Parameters
Linac	4 cold - segments	35 each 8 cavity Cryomodules (1.3 GHz) 2 each 8 cavity Cryomodules (3.9 GHz)
1.3 GHz Cryomodule (CM)	8 cavities/CM	13 m long. Cavities + SC Magnet package + BPM
3.9 GHz Cryomodule	8 cavities/CM	6.2 m long. Cavities + BPM
Additional Cryomodules	1.3 GHz: 4 production + 1 spare 3.9 GHz: 1 spare	
1.3 GHz 9-cell cavity	320 each	16 MV/m; Q0 ~ 2.7e10 (avg); 2.0 K; gradient reach to 19 MV/m (No Q-spec); bulk niobium sheet - metal
3.9 GHz 9-cell cavity	24 each	13.4 MV/m; Q0~2.0e9
Cryoplant (CP1/CP2)	2 each	4.5 K / 2.0 K cold boxes; 4 kW @ 2.0 K; 18 kW @ 4.5 K; 3.7 kW nom. tot. load
Spare compressors	2 Warm He Comp. 1 spare Cold Comp.	
Cryogenic Distribution System (CDS)	210 m vacuum-jacketed line, 2 each distribution boxes, 6 each feedcap / 2 each endcap	