ILC HLRF RDR Chapters – Draft Outline

September 6th, 2006

High Level RF Technical Systems Chapter – 15 pages total

Editors: Ray Larsen, Michael Neubauer, Chris Jensen, Shigeki Fukuda, ??

1. Overview - Baseline Conceptual Designs (1.5 pages)
    a. Introduction: High Availability Design of RF Systems
    b. 10MW L-Band Pulsed Main Linac, Source, RTML Stations
    c. S-Band Pulsed RTML Station
    d. 5MW 650 MHz CW Damping Ring Stations
2. 10MW Station Details (5 pages)
    a. Modulator
        i. Specifications Summary
        ii. Mains Power Source Transformer
        iii. Charging supply 12kV DC Output
        iv. Main capacitor bank & IGBT switches
        v. Bouncer pulse droop compensator
        vi. Pulse transformer 1:10 step-up & HV cables
        vii. Protection interlocks, controls, fire safety
        viii. Diagnostic Interlock Layer
        ix. Factory manufacturing model
        x. Installation & commissioning model
        xi. Cost model and analysis
    b. Klystron
        i. Specifications Summary
        ii. Tube description – multiple vendors
        iii. Focusing magnet, heater power systems
        iv. Oil tank & HV input cable
        v. Instrumentation and Protection interlocks
        vi. Factory manufacturing model
        vii. Installation & commissioning model
        viii. Cost model and analysis
    c. Waveguide Distribution
        i. Specifications Summary
        ii. BCD model
        iii. Cost model & vendor quotations
        iv. Instrumentation and Protection interlocks
        v. Factory manufacturing model
        vi. Installation & commissioning model
        vii. Cost model and analysis
3. S-Band Station Details (1.5 page)
    a. Modulator
        i. Specifications Summary
        ii. Solid state model based on NLC Induction Stack or Marx

iii. Manufacturing, installation & commissioning model
iv. Cost estimate

b. Klystron
   i. Specifications Summary
   ii. Standard SLAC 5045 design
   iii. In-house manufacturing
   iv. Installation and commissioning
   v. Cost estimate

c. Waveguide Distribution
   i. Specifications summary
   ii. In-house non-SLED & SLED versions
   iii. In-house manufacturing
   iv. Installation and commissioning
   v. Cost estimate\

4. 5MW Damping Rings RF Station Details (3 pages)
   a. Modulator, Klystron, Waveguide Distribution
      i. Specifications Summary
      ii. Estimates from 3 Regions based on KEKB, PEPII, Frascati
      iii. Manufacturing models
      iv. Installation and commissioning
      v. Cost models and estimates
5. Area Requirements (Table & comments) (1 pages)
   a. Main Linac
   b. e+/e- Sources
   c. Ring to Main Linac
   d. Damping Rings
6. Discussion of 10MW Station Cost Reduction Alternatives (1.5 pages)
   a. Modulator – Marx R&D
   b. Klystron – Sheet Beam
   c. Waveguide Distribution – Customize, eliminate circulators
7. Illustrations (1.5 pages)
   a. Station block diagrams
   b. Photos of BCD components
   c. Alternative conceptual designs

Total pages 15 pages