

QCM and C50-12 Status Update

Accelerator Operations
2015 StayTreat
15JUL2015

C50-12 Rebuild

General

- Rebuild FEL02 (older C20)
- Reuse most major components
- Cavities, HOM loads, gate valves, etc.
 - Cavities will receive light EP
 - Cavity recipe is same as used for C50-11
- Leverage Qo improvements as proven

FY15 Scope

- Disassemble cryomodule
- Qualify two cavity pairs
- Buyout primary procurements

FY16 Scope

- Qualify two cavity pairs
- Cryo unit assembly
- Cryomodule assembly
- Cryomodule acceptance test
- Cryomodule install and commission



C50-12 Status

Cryomodule

- Disassembly is done
- HOM cans are built
- Rotary feed-throughs are being worked
- Helium vessels have been prep'd
- All primary procurements have been made with exception of \$10K



Cavity Pairs

- One pair is completely disassembled
- Disassembly of second pair is in progress
- 12 dog legs and 112 warm windows have been fabricated
 - Warm windows are intended to replace 106 older style currently installed
 - Windows need to be RF tested



C50-12 Plans

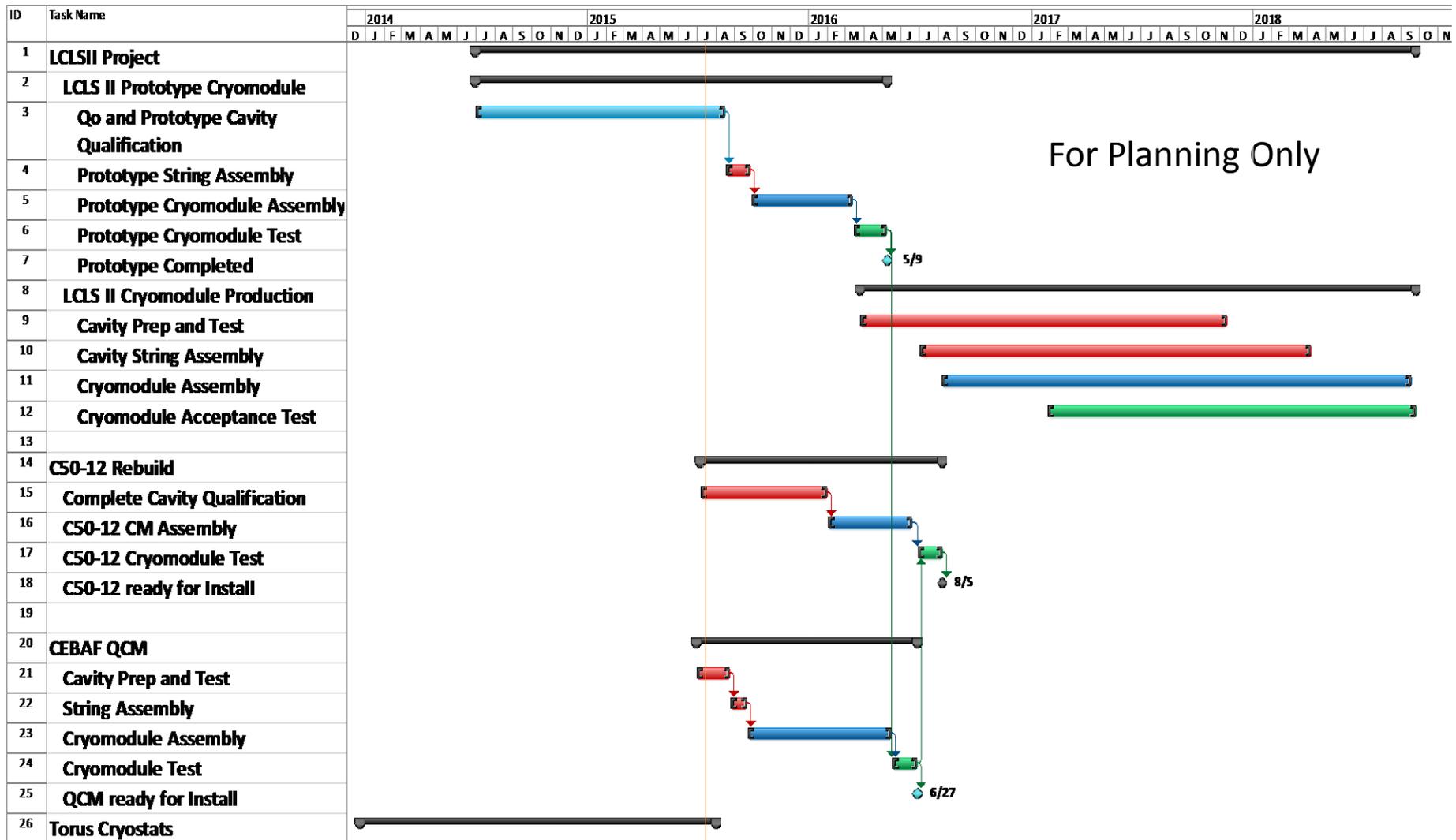
FY15

- Qualify first cavity pair
- Continue to progress on second pair
 - Potential to qualify second pair, depends on LCLS II
- Buy out last \$10K of procurements

FY16

- Qualify remaining cavity pairs
- RF test all warm windows
- Assemble cryomodule
- Complete acceptance test in CMTF
- Available to install in late summer 2016

High Level SRF Production Plan



New CEBAF QCM

General Scope

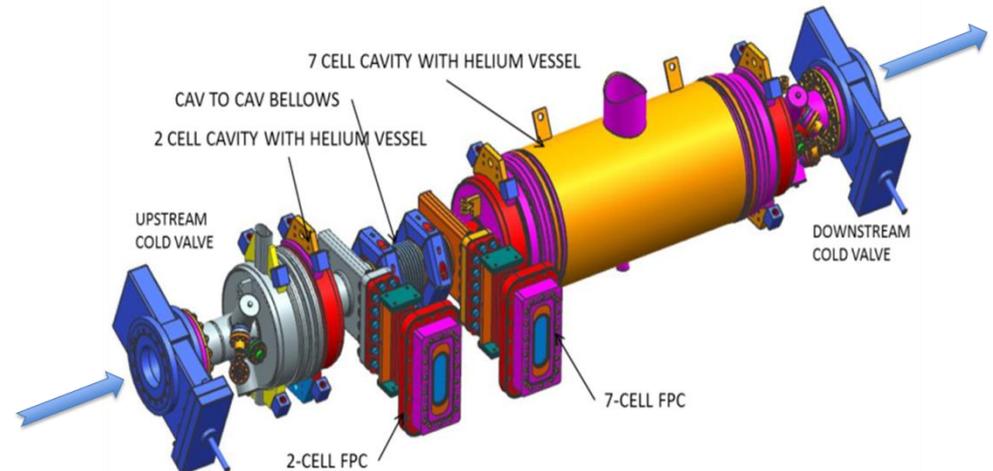
- Design and build a new quarter cryomodule (QCM) for CEBAF utilizing a new 2-cell elliptical and a modified elliptical 7-cell cavity

FY15 Scope

- Complete cavity qualification
- Procure components
- Assemble cavity string
- Complete cryomodule design

FY16 Scope

- Close out CM procurements
- Cryomodule assembly
- Cryomodule acceptance test
- **Cryomodule install and commission**



H. Wang et al. "Injector Cavities Fabrication, Vertical Test Performance and Primary Cryomodule Design"

QCM Status

Cavities

- Both the 2-cell and 7-cell have been fabricated
- Vertical test of the unjacketed two cell is complete
- First vertical test on unjacketed 7-cell is done, needs one more round before welding of helium vessel

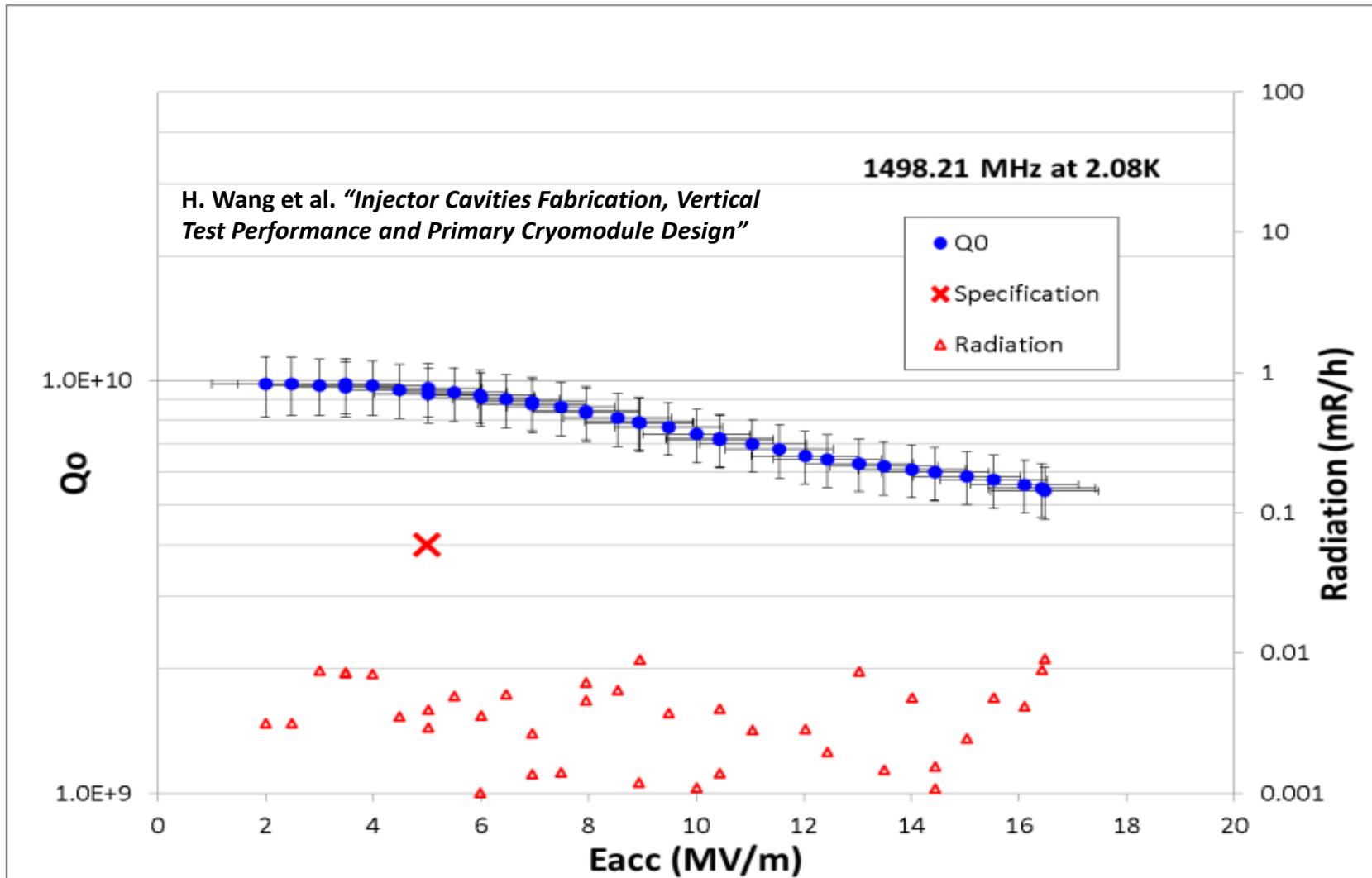
String

- String tooling is 95% completed
- Procurements of string components is 95% done

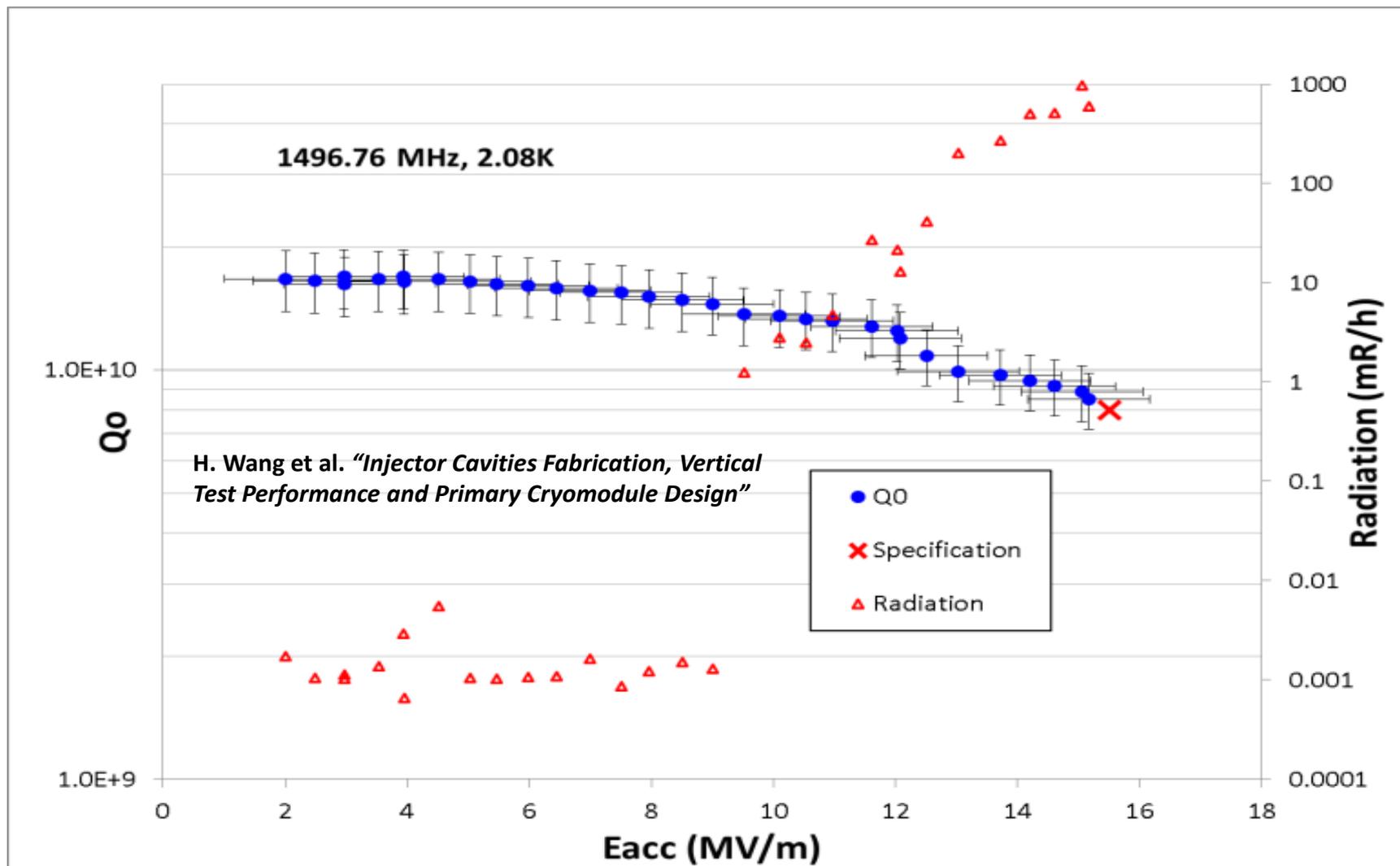
Cryomodule

- Design is in progress
- Long lead items purchased, some are in house
 - Cold and warm tuners, vacuum vessel, space frame, end cans and helium vessels are here

2-cell Cavity 2nd vertical test Q_0 vs E_{acc} curve.



7-cell Cavity 1st vertical test Q_0 vs E_{acc} curve



QCM Plans

FY15

- Weld on helium jackets to 2-cell and 7-cell
- Complete the cavity qualification of jacketed cavities
- **Complete string assembly**
 - Delays in cavity qualification are putting SA in competition with LCLS II
 - Intention is to complete QCM string ahead of LCLS II
- Complete cryomodule design
- Continue to procure long lead cryomodule components

FY16

- Procure any remaining cryomodule components
- Assemble cryomodule
- Complete acceptance test in CMTF
- Available to install in early summer 2016

Summary

- C50-12 is tracking slightly behind plan for FY15
 - Will be ready to install by late summer of FY16
 - Can be pulled to early summer
- CEBAF QCM is tracking per current schedule
 - Available to install early summer
- LCLS II is stretching staffing, plan in place and being worked
 - Added process engineer and an electronics tech
 - Will add 3-4 term mechanical techs in FY15 to support prototype CM assembly
 - More will be added in FY16 for production

Backup

Primary Differences with FEL02

As compared to CEBAF C20 → C50

- Inner adapters are larger in diameter
- HOM loads are different and are heat sunk to shield circuit
- End dishes are welded to gate valve
- Gate valves ID are larger
- Bellows in between cryo units are larger bore and RF shielded