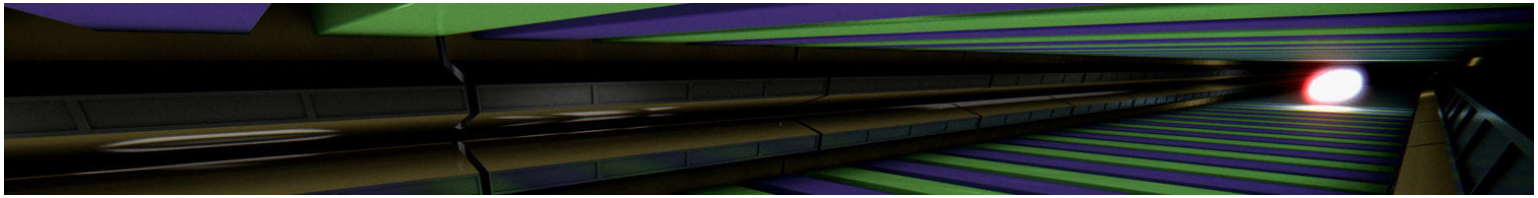
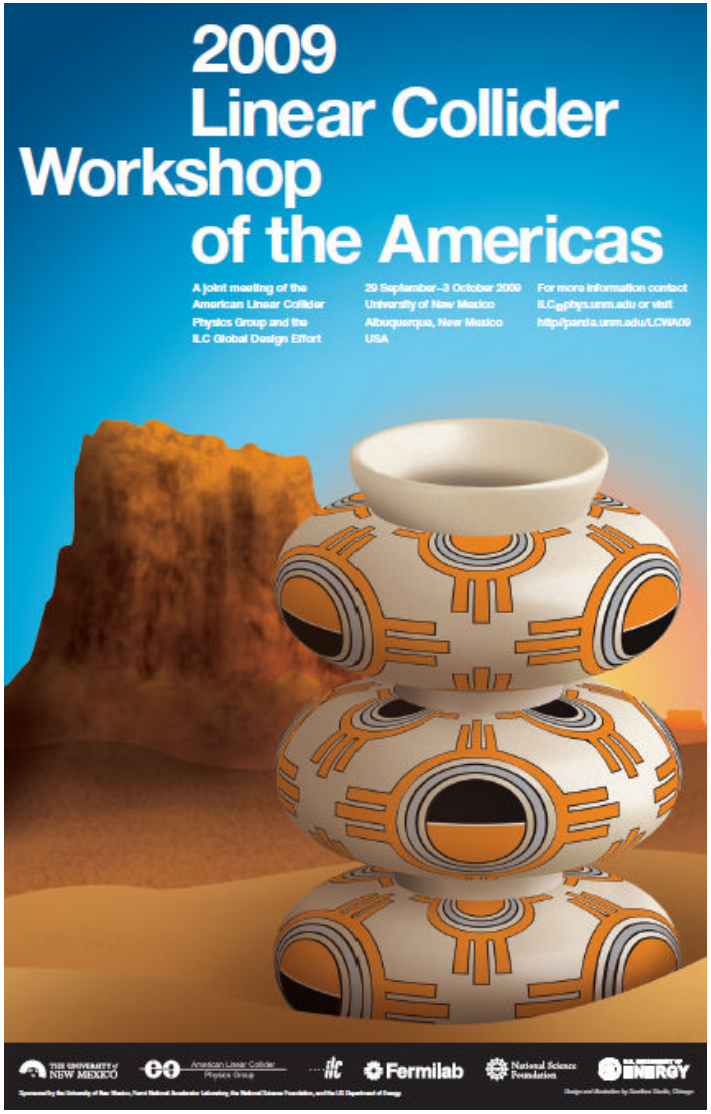
European XFEL





XFEL Cavity Production Plan

Hans Weise / DESY

DESY

HELMHOLTZ ASSOCIATION

The XFEL Cold Linac is a common project of many SRF experts sharing the responsibility for the superconducting linac.

XFEL Cold Linac components

- XFEL Cavities to be contributed by DESY and INFN Milano

- Assembly to be done at CE Saclay
- Components from a number of institutes

irfu cea saclay

In2p3

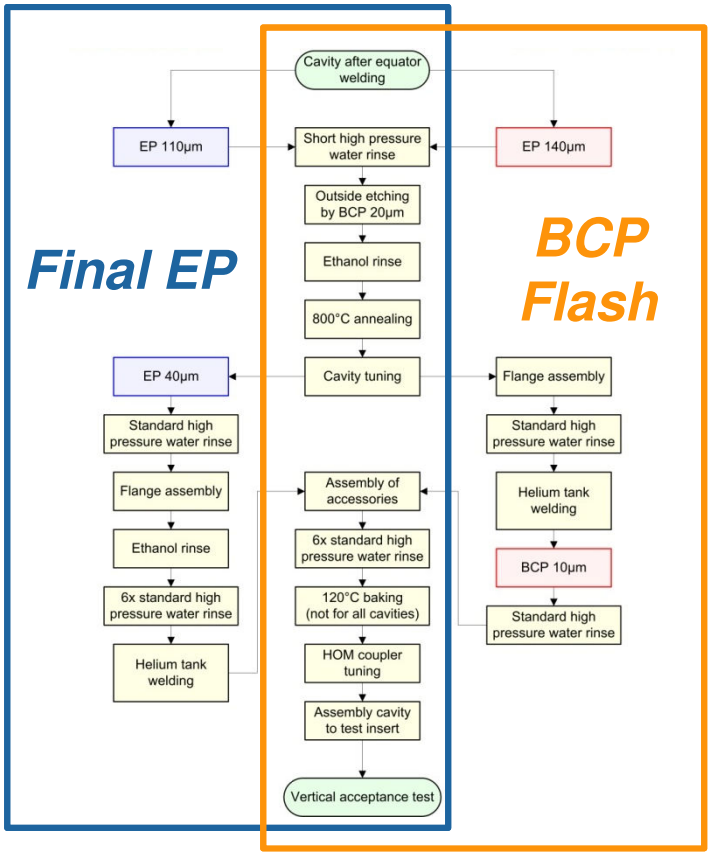
MINISTERIO DE EDUCACIÓN Y CIENCIA

Ciemat Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas

Institute of High Energy Physics
Chinese Academy of Sciences

XFEL Cavities

- **Two schemes** for the final surface treatment (***Final EP*** and ***BCP Flash***) were studied with **cavities from two different vendors**.
- The **preparation strategy** to go for a final treatment with the cavity already welded into the He-vessel was investigated.



- **Results** are:
  - yield curves for the different schemes
  - yield curves for the different vendors
  - a preparation strategy
  - a strategy for the call for tender

SRF09
- see THPPO072
- B. van der Horst et al.

preparation cycle

SRF09
- see TUPPO050
- D. Kostin et al.

9-cell cavity cw tests

SRF09
- see TUPPO051
- D. Reschke et al.

analysis of recent 9-cell cavity tests

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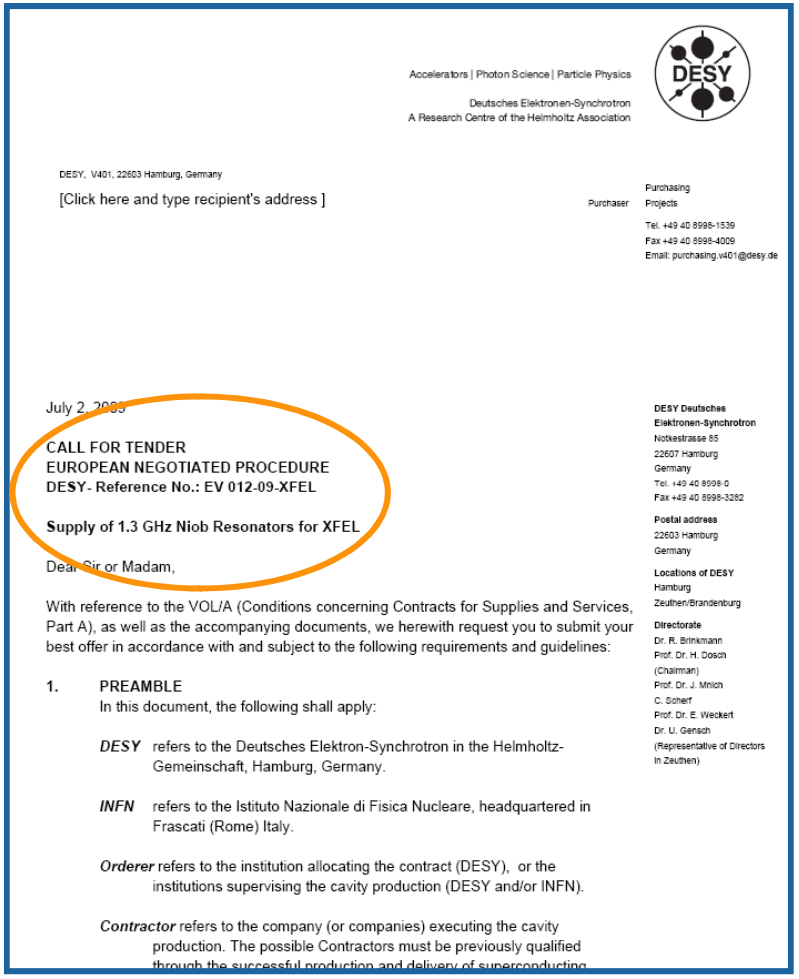
XFEL Cavity call for tender



Accelerators | Photon Science | Particle Physics

Deutsches Elektronen-Synchrotron
A Research Centre of the Helmholtz Association

DESY, V401, 22603 Hamburg, Germany

[Click here and type recipient's address]

Purchaser

Purchasing
Projects

Tel. +49 40 8998-1539
Fax +49 40 8998-4009
Email: purchasing.v401@desy.de

July 2, 2009

CALL FOR TENDER
EUROPEAN NEGOTIATED PROCEDURE
DESY- Reference No.: EV 012-09-XFEL

Supply of 1.3 GHz Niob Resonators for XFEL

Dear Sir or Madam,

With reference to the VOL/A (Conditions concerning Contracts for Supplies and Services, Part A), as well as the accompanying documents, we herewith request you to submit your best offer in accordance with and subject to the following requirements and guidelines:

1. PREAMBLE
In this document, the following shall apply:

DESY refers to the Deutsches Elektron-Synchrotron in the Helmholtz-Gemeinschaft, Hamburg, Germany.

INFN refers to the Istituto Nazionale di Fisica Nucleare, headquartered in Frascati (Rome) Italy.

Orderer refers to the institution allocating the contract (DESY), or the institutions supervising the cavity production (DESY and/or INFN).

Contractor refers to the company (or companies) executing the cavity production. The possible Contractors must be previously qualified through the successful production and delivery of superconducting

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(Chairman)
Prof. Dr. J. Mnich
C. Scherf
Prof. Dr. E. Weckert
Dr. U. Gensch
(Representative of Directors in Zeuthen)

- Cavity **Call for Tender was published** on July 2nd, 2009.
- **Production and preparation** in industry.
- Contract to be allocated by DESY.
- Supervision of cavity production by DESY and INFN.
- Details can be published only 6 months after contracts are placed.

DESY HELMHOLTZ ASSOCIATION

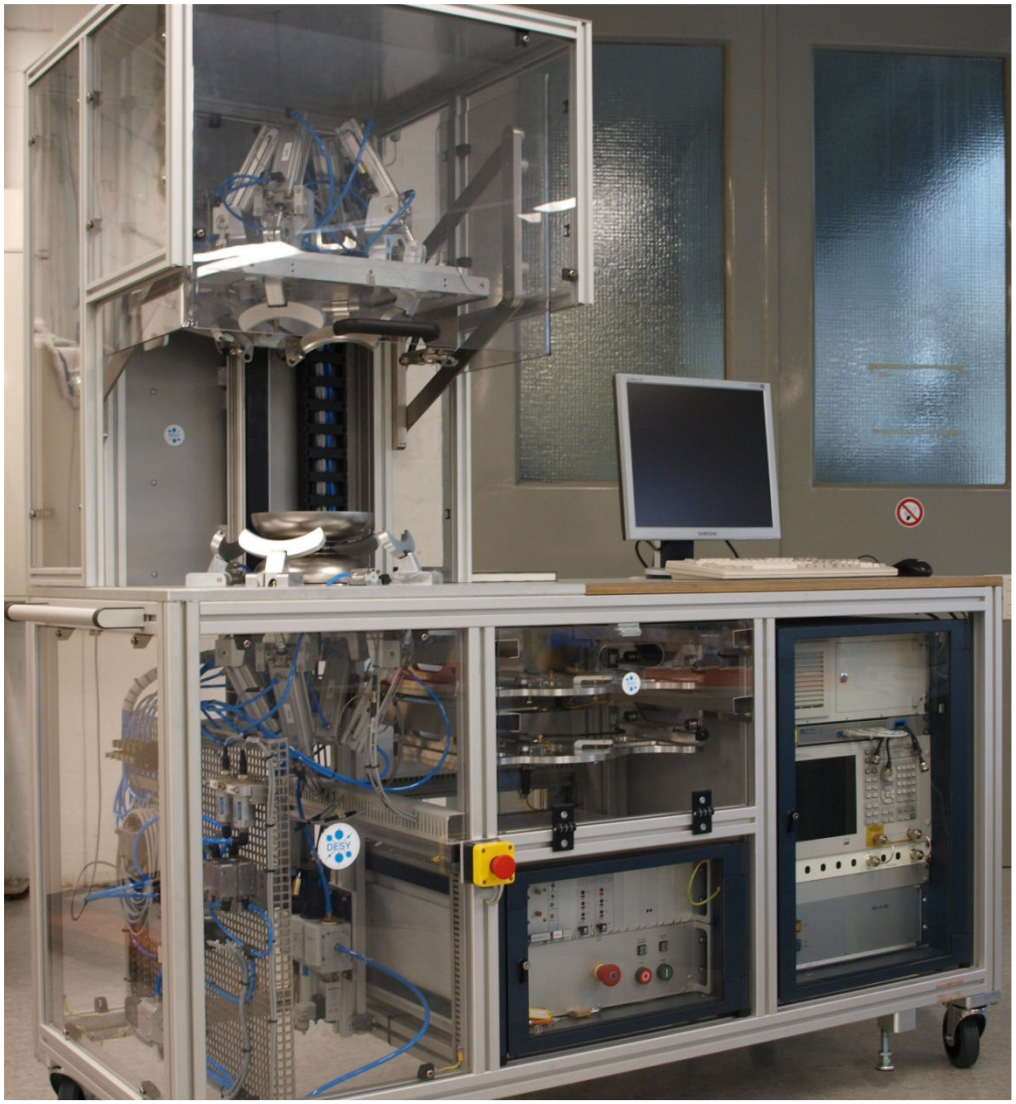
XFEL Cavity call for tender

- The Call for Tender invites **two companies being qualified for the XFEL cavity production**. Both have successfully built cavities fulfilling DESY's specification.
- The specifications describe the complete **production and preparation** including the **delivery to DESY** in batches of four cavities ready for vertical testing.
- A **minimum gradient** has been specified as well as the **unloaded quality factor**.
- Acceptance to be split into different levels
  - w/o He tank (a larger number of quality checks is required)
  - w/ He tank (further checks)
  - complete documentation of production and treatment/preparation
  - final RF acceptance test to be carried out at DESY
- Some **material, equipment, and accessories** are provided to the contractor.

European XFEL

RF Measurement for XFEL Cavity Production

way to go



- Prototype was successfully used for the recent cavity production.
- **Considerably shorter tuning time.**
- Automation and documentation.
- Minor changes required for industrial use.
- Two more machines under fabrication.

SRF09

- see THPPO071
- J. Iversen et al.

RF measurement

Tuning Machine

- **Two machines** for series cavity production are under commissioning at DESY.
- Development of software and electronic devices done at FNAL.
- CE certification of the entire machine according to European rules and laws.
- Machine **can be operated by Non-RF-Experts**!

SRF09
- see THPPO074
- J.-H. Thie et al.

automatic cavity tuning machine

XFEL Cavity – Scope of supply

- Purchase of Niobium for series production.
- Upgrade of infrastructure and production tools for series production.
- Mechanical fabrication of cavities incl. a specified number of pre-series and reference cavities.
- Set up of infrastructure for cavity treatment (e.g. clean room facilities, cleaning equipment, chemical surface treatment, 800ºC furnace, 120ºC baking, HPR etc.)
- Helium tanks and welding.
- Accessories.
- Cavity treatment.
- Assembly of HOM / pick-up / high Q fix antennas.
- Leak test, cavity installation into transport frame and shipment for the vertical RF test.

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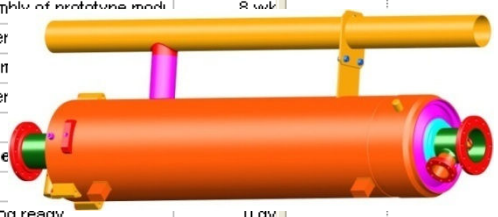
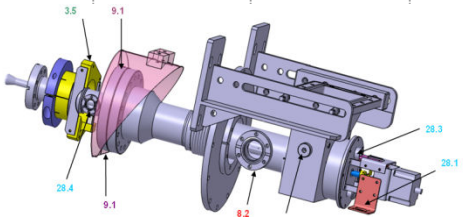
XFEL Cavity schedule

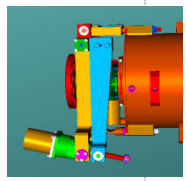
schedules … schedules …schedules

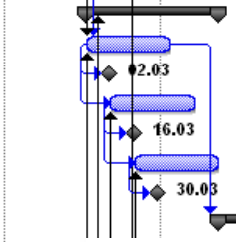
Gantt Chart

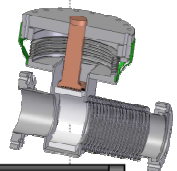
33				
34		WP3/9 out PM in	string and module assembly training	200 dy
35			initial training of new assembly teams	4 wk
36			1st dis- and re-assembly of prototype modu	8 wk
37			CMTB test of re-assembled prototype #1	4 wk
38			2nd dis- and re-assembly of prototype modu	8 wk
39			CMTB test of re-assembled prototype #1	4 wk
40			1st dis- and re-assembly of prototype modu	8 wk
41			CMTB test of re-asser	
42			2nd dis- and re-assen	
43			CMTB test of re-asser	
44				
45			pre-series module asse	
46		WP03 out PM in	pre-series module #1	
47		WP09 out WP03 in	first pre-series string ready	0 dy
48		WP03 out PM in	pre-series module #2	7 wk
49		WP09 out WP03 in	second pre-series string ready	0 dy
50		WP03 out PM in	pre-series module #3	7 wk
51		WP09 out WP03 in	third pre-series string ready	0 dy
52			start CMTB module testing	60 dy
56				

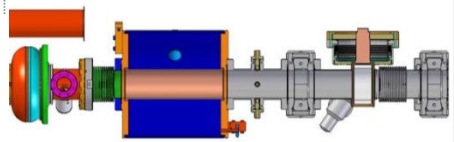






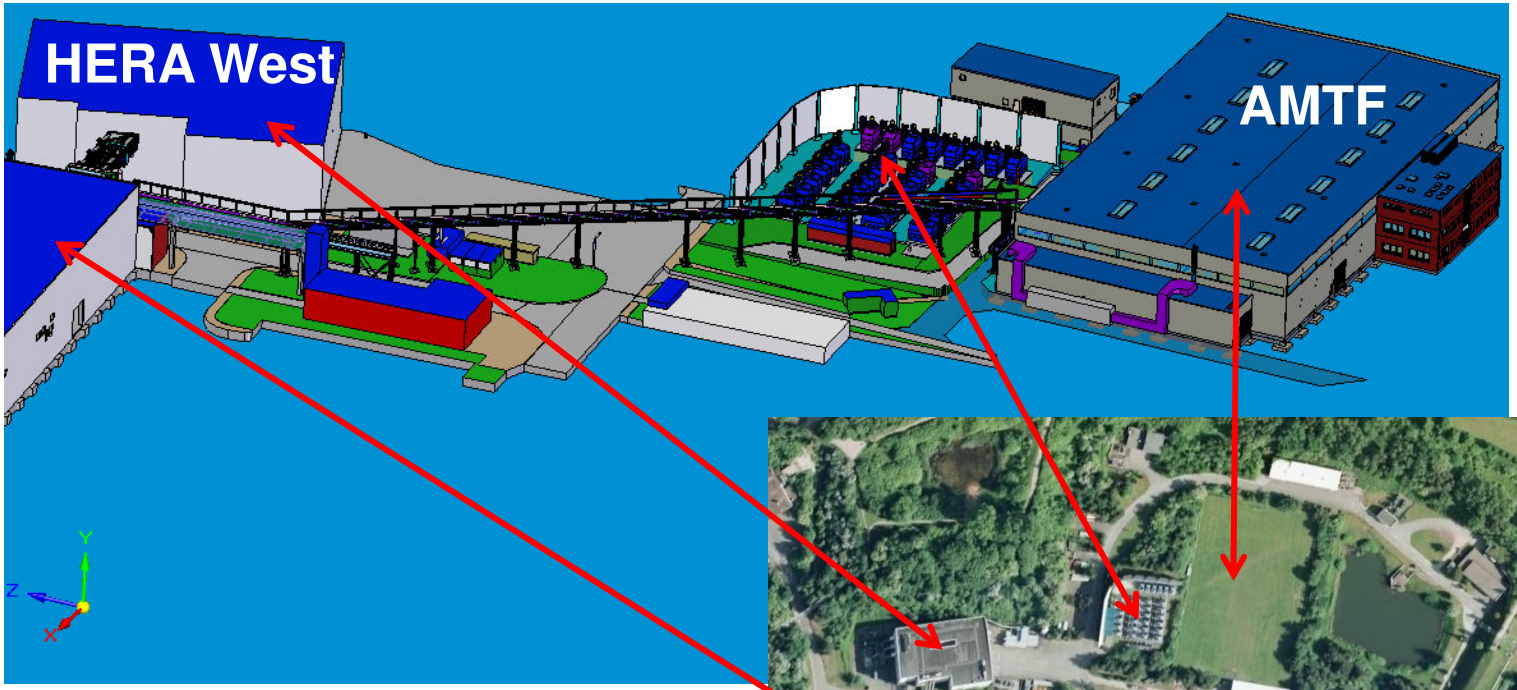


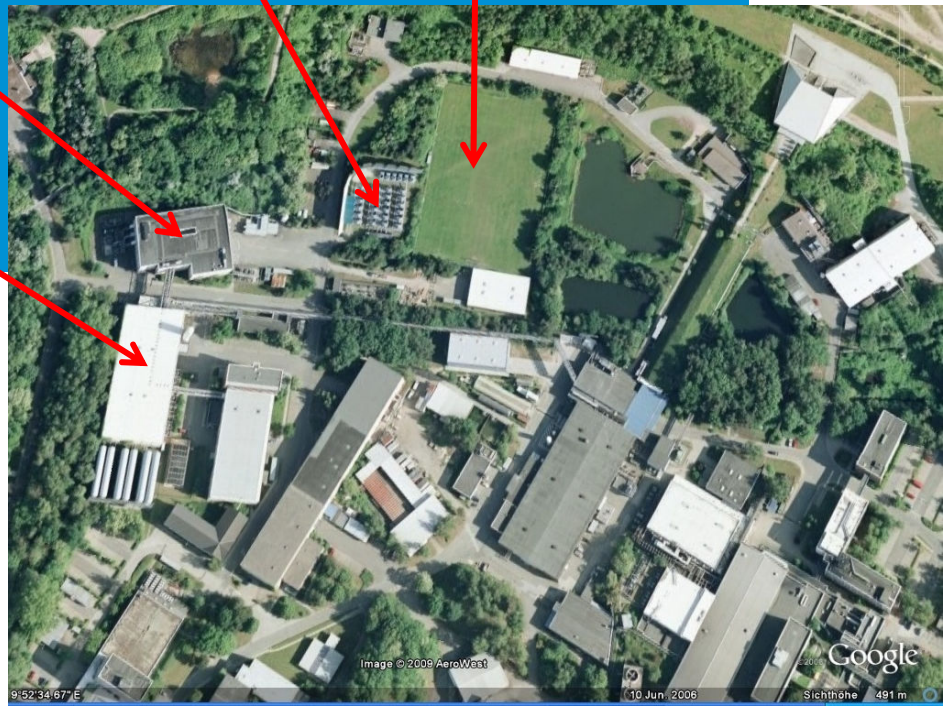




- The cavity production schedule has to match with the **one common schedule** with all necessary **links between the individual cold linac work packages.**
- The **series production** should start early summer 2011 and will last approx. two years.
- **We need to see AMTF commissioning beginning of 2011.**

Accelerator Module Test Facility (AMTF) Including Single Cavity Tests





- First cavity tests required for 1/2011
- Commissioning of module test facility 4/2011
- AMTF ready for infrastructure installation 3/2010

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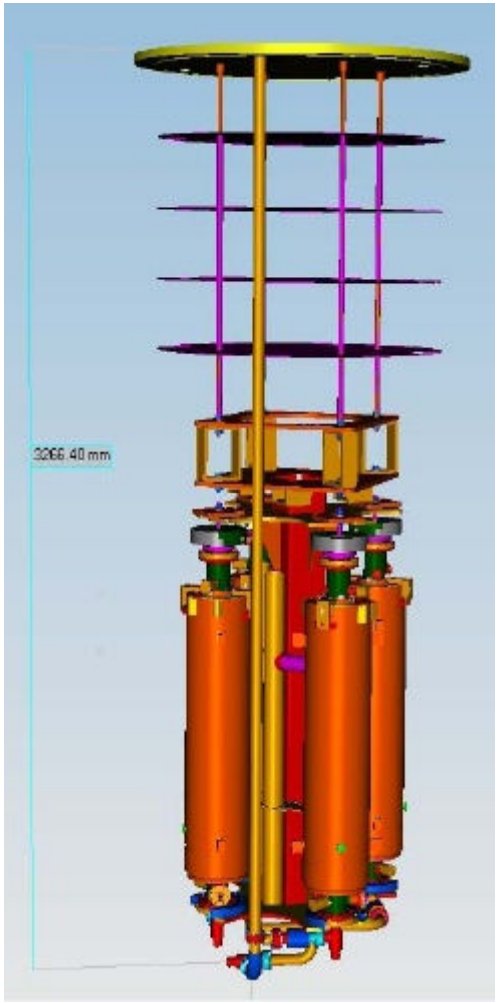
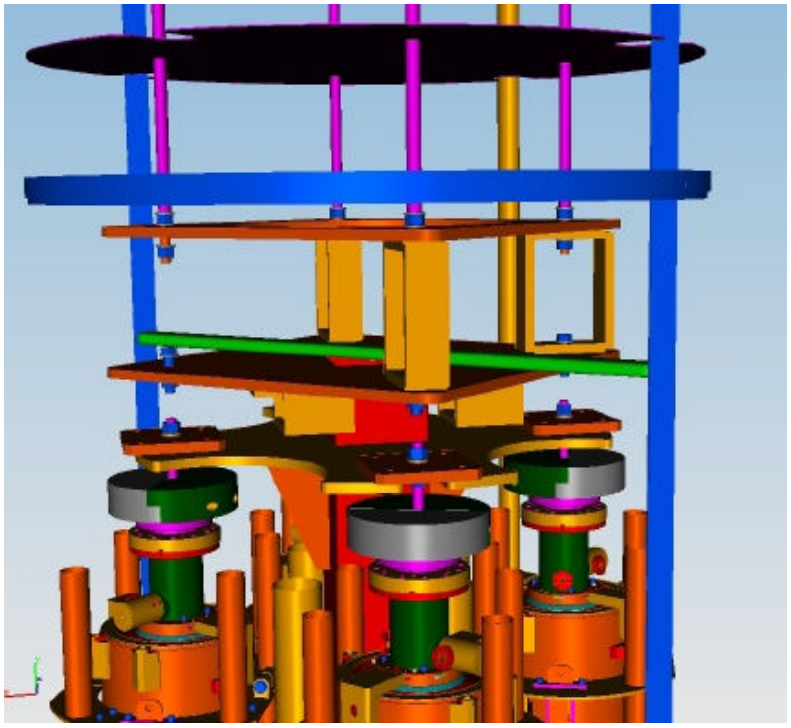
Accelerator Module Test Facility (AMTF)

European XFEL

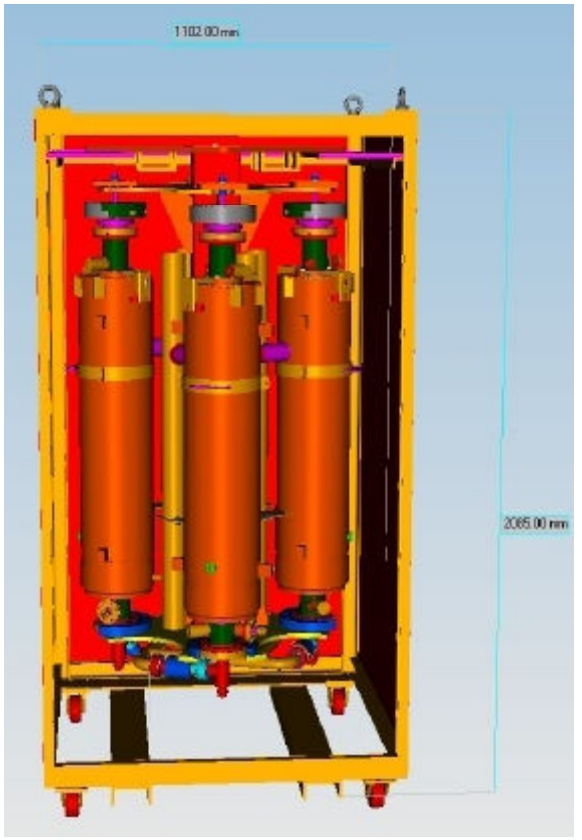
Cavity Tests at AMTF Starting in 2011





- Transportation frame; actual design, tests with single cavities on-going

- 4-cavity insert for AMTF test cryostats; design ready, construction a.s.a.p.



- Thanks to the XFEL cavity team…