2nd CLIC Module review

- Introduction
- Relation to first review
- Subjects not explicitly covered

Some remarks from the first module review (my interpretation)

- Existing T0 might be not realistic/relevant enough
- Simplify program, use special dedicated test set up's when possible
- Check and understand complex tolerances, guidance from beam physics team
- Review periodically
- Stabilization tests are not part of the program anymore
- Concerns about structure straightness
- Do better/more relevant thermo-mechanical measurements (displacements, transients, operation scenarios, better analysis)
- Review CLIC installation concepts, Pacman, Transport tests, pre-alignment strategies
- Revised vacuum system, separate tests fine
- Change program, no T4, 010 configuration, only one CLEX module

2nd CLIC Module review

- **Agenda of the review**
  - Thermo- mechanical and alignment results for the first T0 model, Experiments finished and analyzed
  - CLEX module installed, results and conclusions
  - Presentation of the new lab-module configuration Logic of the setup and planned experimental program
  - Comparism with CDR documentation
  - Future plans towards a second generation module
- **Goal of the review**
  - Present progress and current and future plans
  - Convince CLIC management/experts about this work plan

Issues not explicitly mentioned today

- **Stabilization**
  No change since review. Unfortunately subject for time being not followed up because of lack of resources. Module program not the ideal place anyway. Some work in ISR and PACMAN.

- **Fabrication, assembly, transport strategy**
  We are aware that the one described in the CDR might be not valid and needs revision. Wait for module test results and PACMAN results before defining that strategy.
  Transport tests to be designed accordingly, not a priority right now

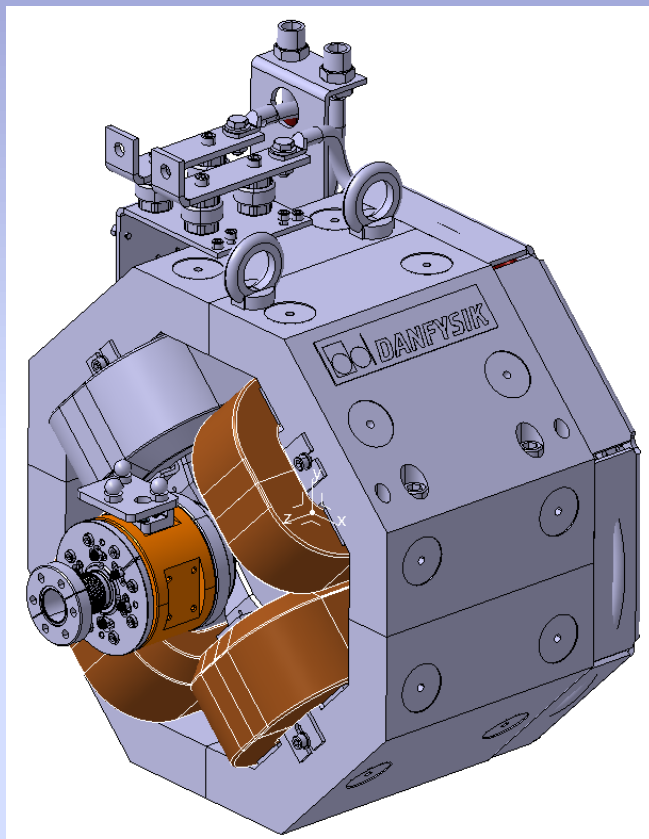
- **Connection to PACMAN**
  PACMAN deals with the best method for the fidualisation of components to grantee best pre-alignment results not directly with the engineering of the modules. Results should be fed into the next generation modules (see Carlo's talk)

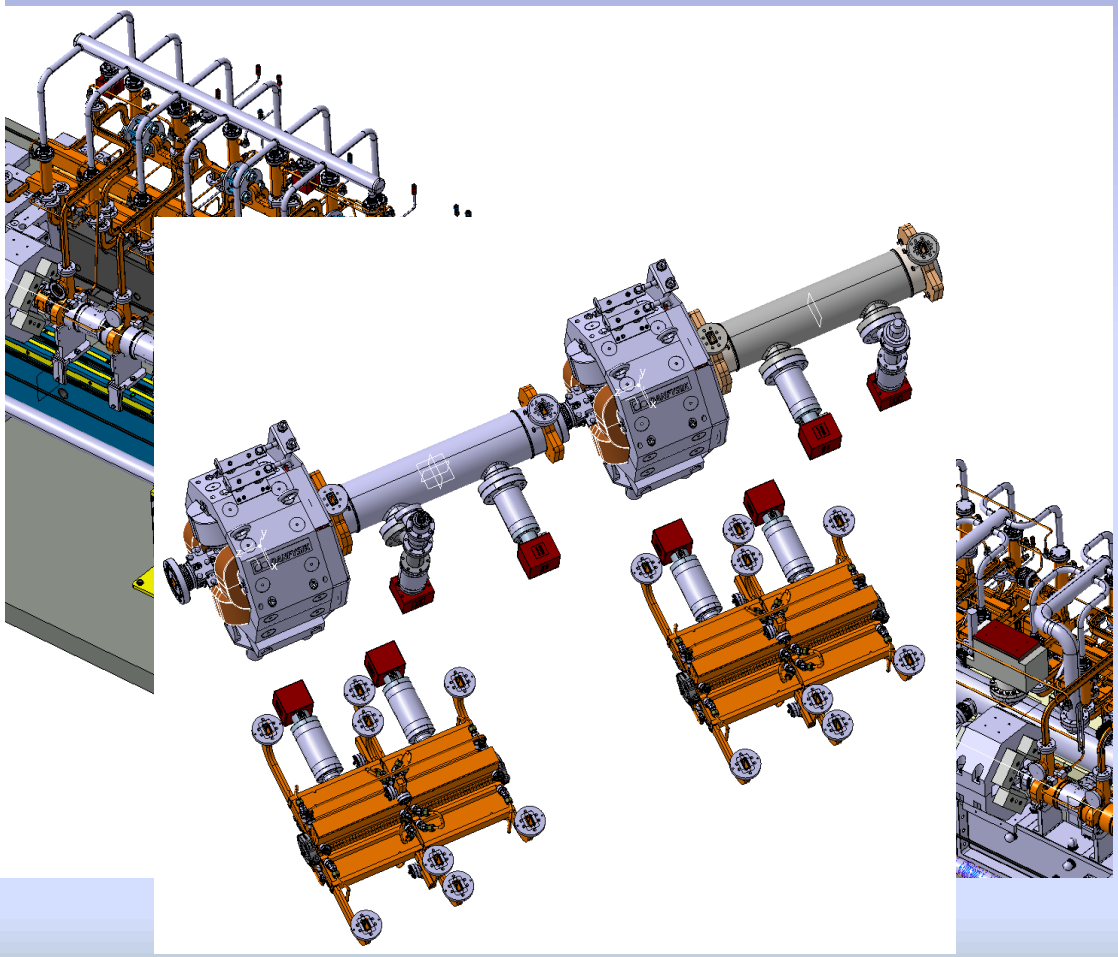
A word on tolerances

- Tolerances were questioned in the first review.

Collected a comprehensive set for the module work,
Aim for the current module program will be to get data on as many of the tolerances as possible and feed into the next generation modules.
For time being girder coupling and structure straightness are the most stringent once.
Need more data on what can be achieved with which effort before revising possibly some tolerances.

The new plan
Configuration 0-0-1

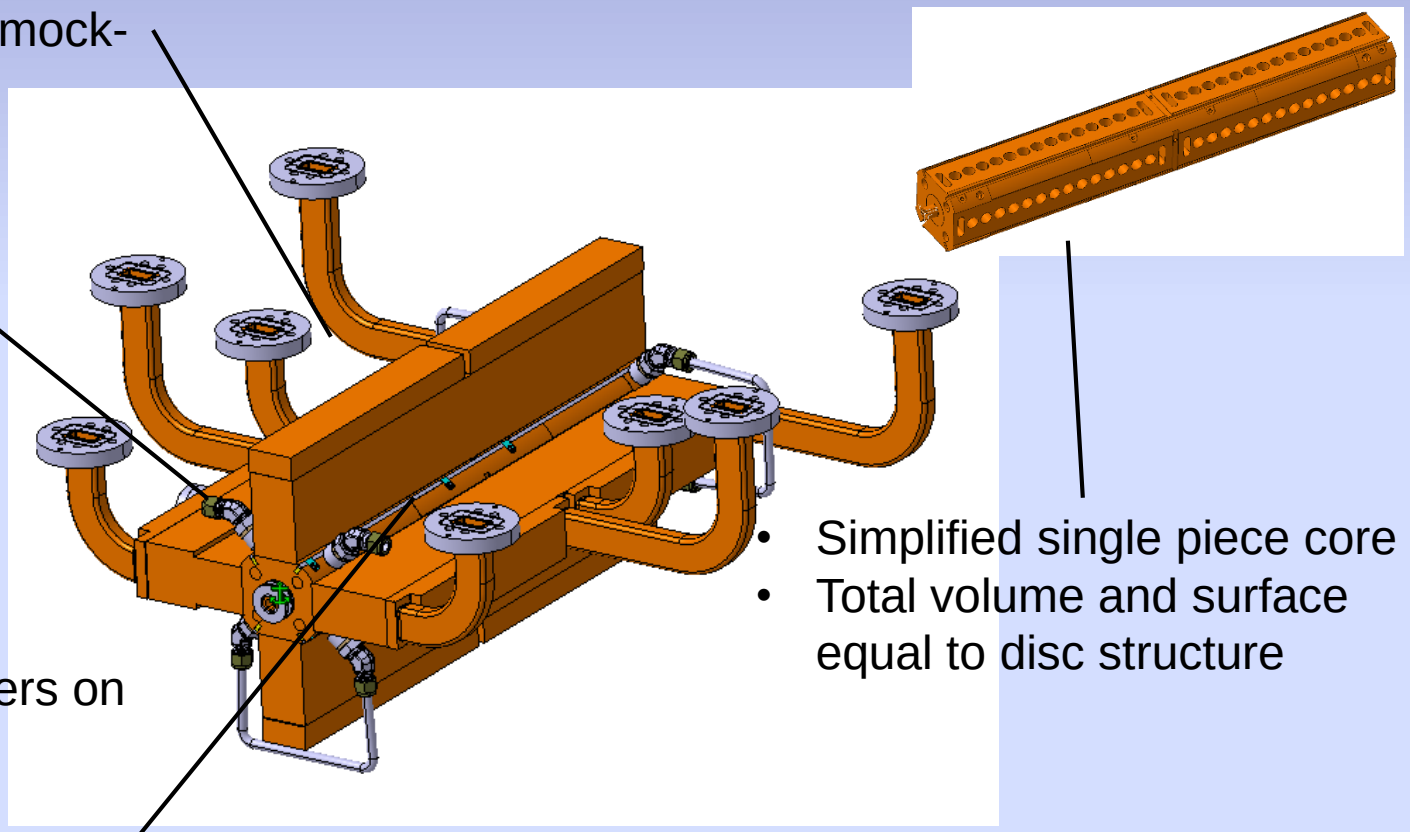




Mock-ups

Call for tender launched for six units with industry
and one structure done in house
Can be seen as a first step towards industrialization

- Damping material mock-up included
- Integrated cooling for both AS
- Independent heaters on the outer side
- Possibility of simultaneous vacuum and thermal loading



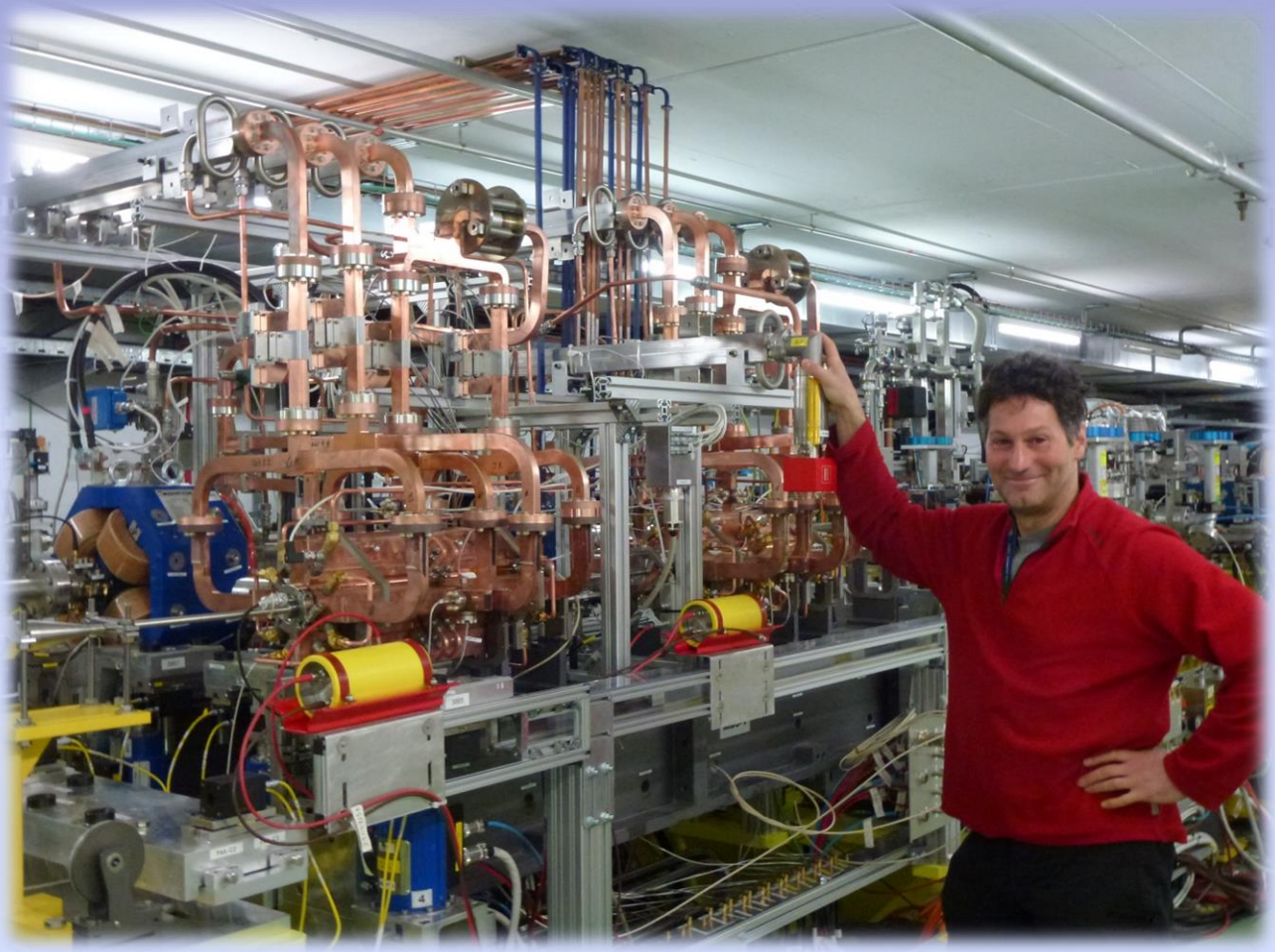
- Simplified single piece core
- Total volume and surface equal to disc structure

Alex Vamvakas

Scope and resources of the two beam module program 2014-2019

2014	2015	2016	2017	2018	2019
CEX Module installed	Lab- Module string installation Measurements	Measurements			
Lab T0(1) measurements Modification of T0(2) Acc-structure Quads Vacuum system	Lab T0(1)+T0(2) Construction and Measurements Vacuum	Three module string in Lab Measurements Apply lessons learned Transport tests ?	Next generation modules ?!		
2 MCHF	1 MCHF	0.6 MCHF			
12.5 MY	7.5 MY	3.5 MY			

First CLIC prototype module completely installed in CLEX



Big thanks to everybody helping to get it done !

Two Beam Publicity
The Beam and Beauty

CLICING INTO ACTION

Putting its acronym into action, the Compact Linear Collider (CLIC) collaboration is testing its first compact accelerator module in the CTF3 test facility. Fed by high-power waveguides, cables and cooling tubes, the module has all the functions of future CLIC modules and allows the experts to test all the features, including frequency, losses, damping, acceleration and deceleration.

The new CLIC module in the CTF3 test facility.

CLIC is one of the potential follow-up projects to the LHC, alongside the International Linear Collider (ILC) and the Future Circular Collider (FCC) studies. Instead of smashing protons into protons, it is designed to collide electrons with positrons. Following the publication of its CDR in 2012, the CLIC collaboration entered the project preparation phase - testing its unique technology, making improvements and taking a closer look at the cost of the individual components.

CERN Bulletin article and Italian TV documentation

End

CLIC module requirements Tolerances, pre-alignment and installation scenarios

- Pre-alignment tolerances MB: 14 μm rms for rf structures, 17 μm rms for quads, BPMs 10 μm ,10 μm rms in BDS over 200 m with respect to the reference wire
- Pre-alignment tolerances DB: Quads 20 μm, PETS 100 μm/ 1 mrad, BPMs 20 μm ?
- Vibration tolerances MB: Quads 10 nm horizontal, 1.6 nm vertical; ACC 8 μm, 6 μrad horizontal, 1.4 μm, 1.1 μrad vertical
- Structure straightness 5 μm, wake field monitor 3.5 μm ?
- Delta T for one structure 5 deg, 10 deg for one superstructure ? Each SAS is individually regulated, one valve for PETS, MB Quad and DB quads per module
- Girder deformation loaded 10 μm
- Pre-alignment at 20 deg, calculate displacement with temperature
- Installation sequence: Install support with wire system, align, install modules (girders with equipment)
  Install components on girder with cradle, determine position, align (one girder/ full module on which reference ?), transfer to tunnel, link to wire already installed and aligned ?