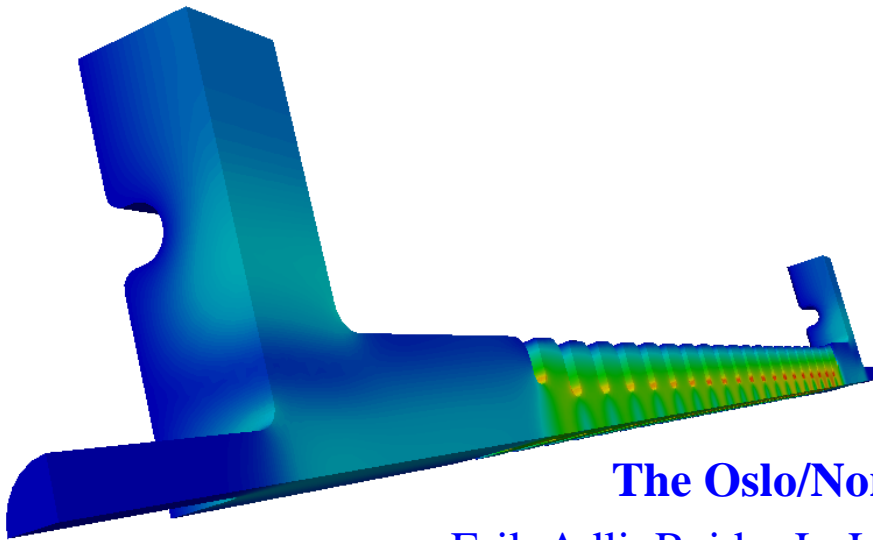
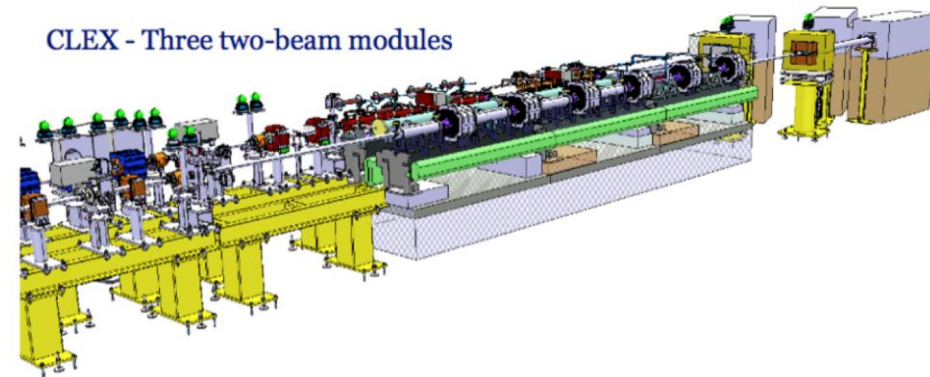


Two-beam acceleration : rf design and beam physics studies



CLEX - Three two-beam modules



The Oslo/NorduCLIC group

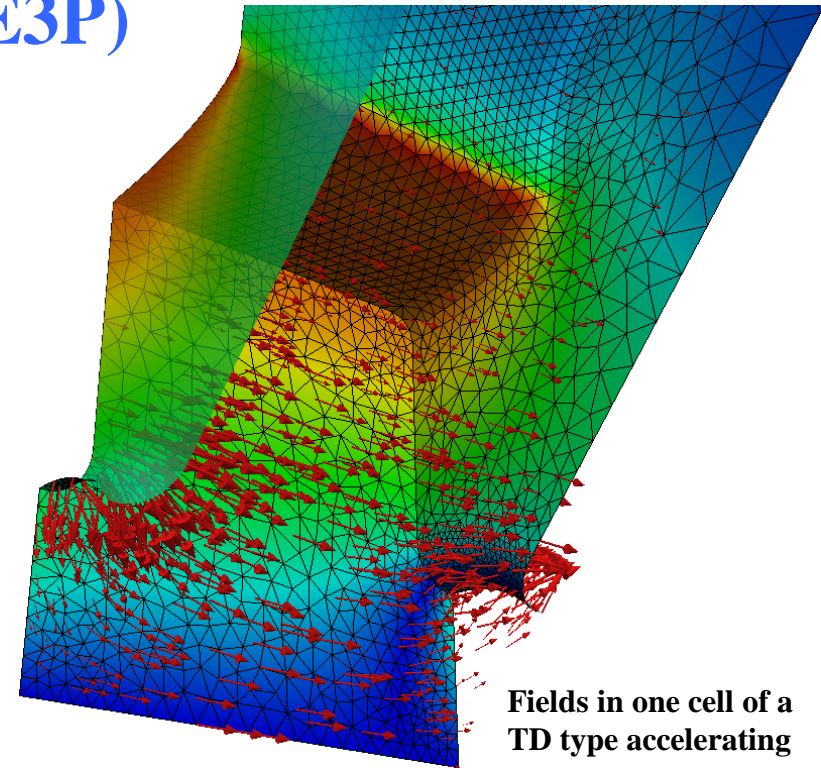
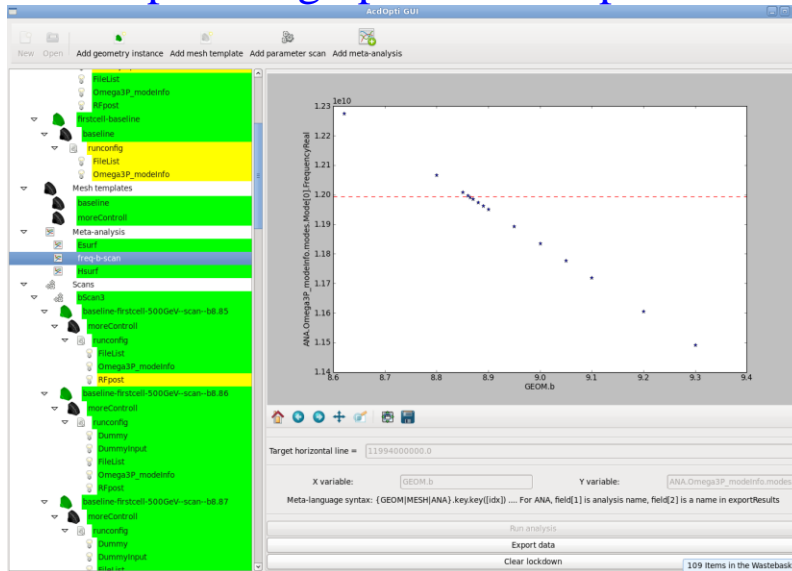
Erik Adli, Reidar L. Lillestøl, Kyrre N. Sjøbæk

Department of Physics, University of Oslo, Norway

Wednesday, Nov 3, 2011

Accelerating structure rf design using advanced parallel rf design codes (ACE3P)

- We study optimization of CLIC accelerating structures using Omega3P
- Development of auxiliary ACE3P software for rapid design parametric optimization



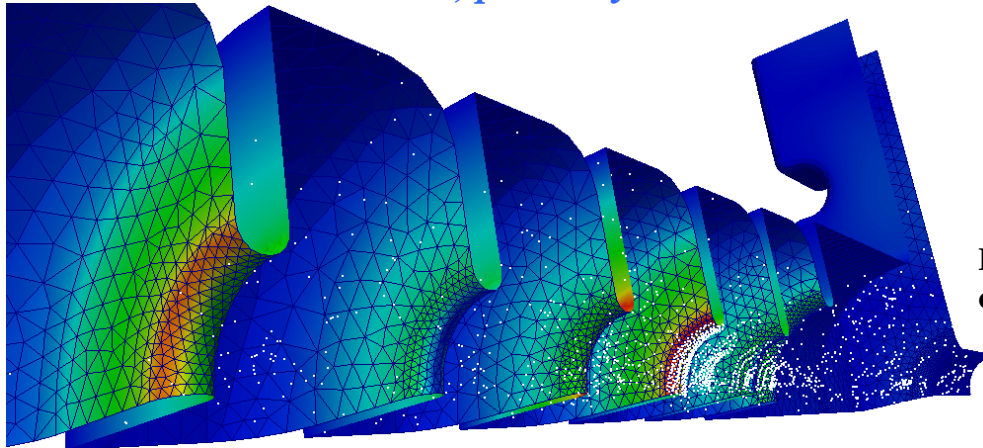
Fields in one cell of a TD type accelerating structure

Frequency as function of cavity radius

- Currently working on optimization of CLIC 500 GeV accelerating structure, will continue with refinement of CLIC structures (NorduCLIC structures) linked to NorduCLIC structure production and test, see HIP/NorduCLIC **RF-DESIGN**

Simulation of dark current emission and transport

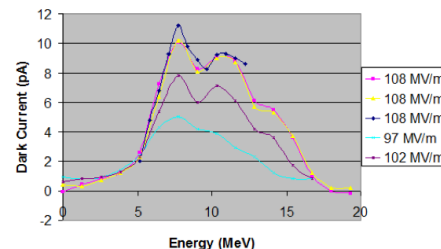
- We plan to develop framework for emission based on Fowler-Nordheim model, particle tracking of dark current in main linac, probably based on ACE3P



HIGH-GRADIENT

F-N emission from a single iris and tracking of emitted electrons in a T18 structure

- This framework needs to be benchmarked against experimental results (measured electron spectra). This can be done at NEXTEF/KEK, and in the future possibly at the NorduCLIC 12 GHz Test Stand in Uppsala

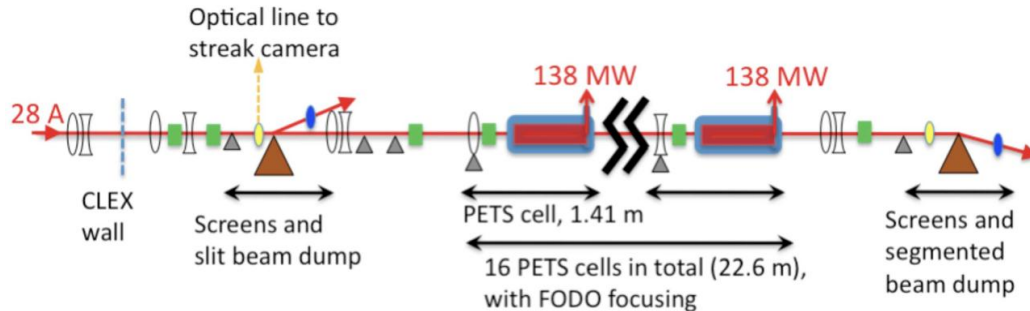


Example of emitted spectra from T18 structures tested at NEXTEF/KEK

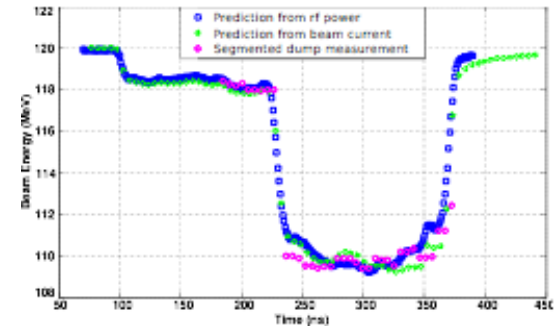
- Ultimately we want to study if there are luminosity and gradient limitations due to dark current emission, which may lead to input to further NorduCLIC rf design refinements
- In co-operation with other NorduCLIC groups : relation dark current emission and break down, see HIP/NorduCLIC presentations

CTF3 : Decelerator Test Beam Line and Two Beam Modules

- We have performed extensive studies of beam physics and instability studies of heavily decelerated electron beams

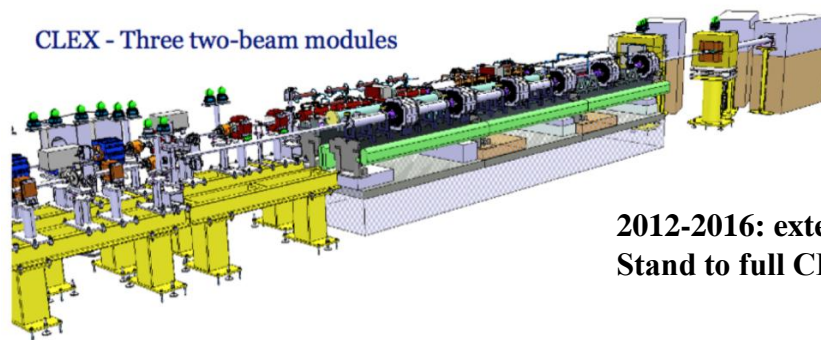


The Test Beam Line (TBL)



10 MeV deceleration in the TBL

- We plan to follow the experimental verification in the decelerator TBL until the completion of the program as well, as the verification of drive beam transport in the two beam module strings



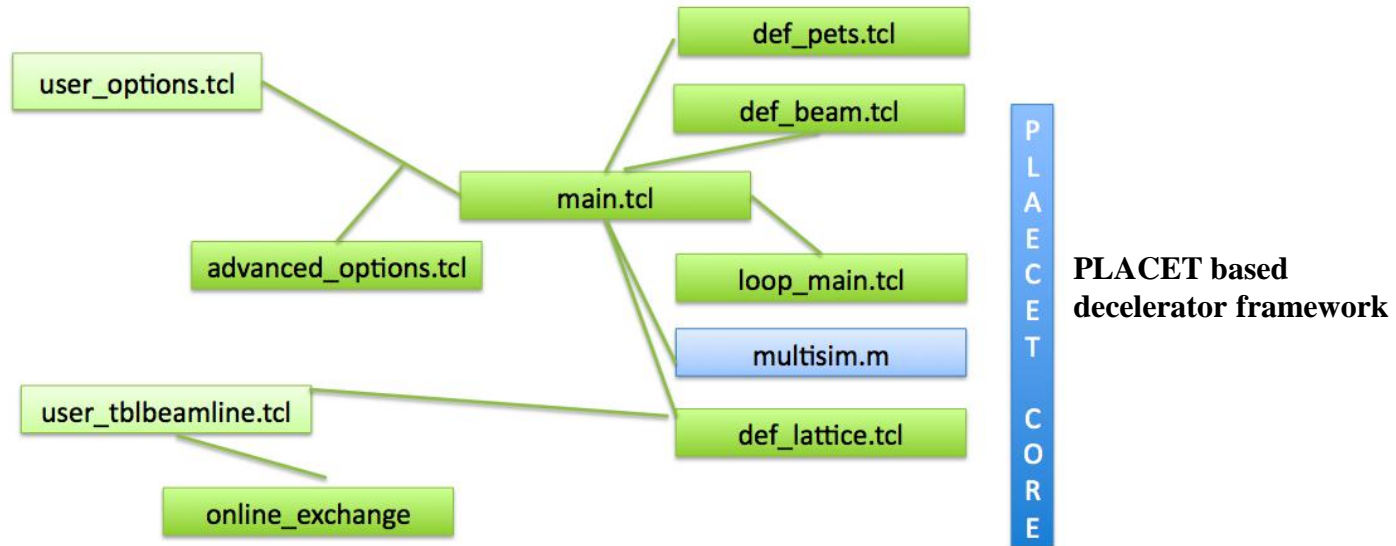
CTF3-003/CTF3-004

2012-2016: extension of the Two-beam Test Stand to full CLIC modules (1, 3, N ...)

- This includes operational and analysis support for the two experiments. See also talk by Uppsala/NorduCLIC and HIP/NorduCLIC on TBM

Incorporation of the results of the above studies into main linac detailed design

- We already have extensive experience with CLIC beam physics studies, including use and development of the simulation code PLACET



- We plan to participate in the detailed design studies of the decelerator and the main linac, focusing on design improvement feeding back the result of the NorduCLIC studies **CD-ML**
- If we acquire additional funding we would also like to contribute to feedback design due to our significant expertise in this area (**CD-LUMI: only if additional funding**)