

CLIC-ILC BDS & MDI work

Strategy

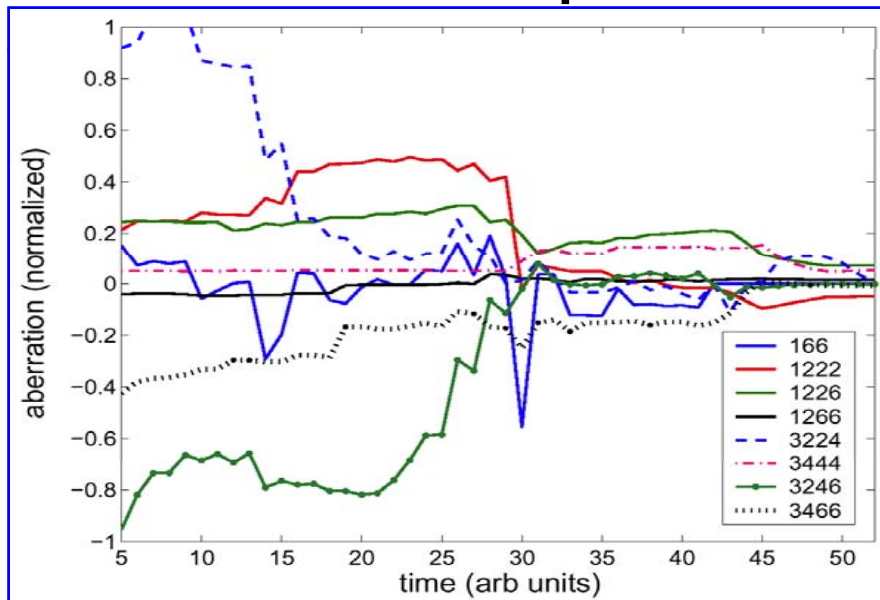
- CLIC and ILC colleagues are looking forward to work together
- Consider this as a natural continuation of long and fruitful collaboration
- Expect that challenging scientific tasks will benefit ILC and CLIC research, and both short and long term program of involved institutions
- Expect that ideas and solution would have broad applicability and we will be proactive in search of such opportunities

Optics Design and Optimization

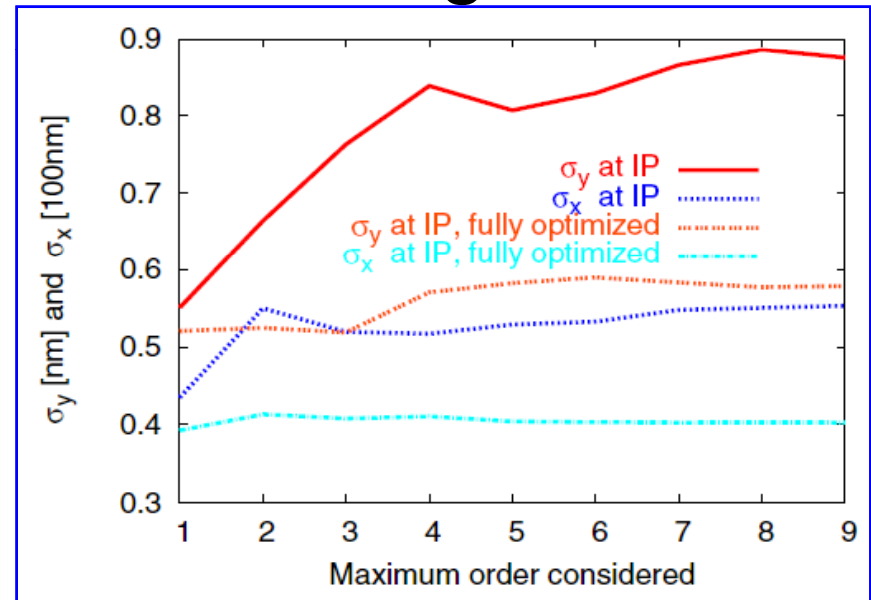
- Design concepts and strategy
 - Collimation system
 - Final focus system
 - Diagnostics sections
 - Took energy measurement station design from ILC
 - Extraction lines
 - Started work on ILC 2mradian and CLIC extraction line instrumentation (include 14mradian?)
- Optimisation tools
 - Share and cross apply
- Tracking tools
- Beam based correction/tuning/feedback

Optics optimization

- Tools developed for optimization of beam delivery will be mutually used for further improvement of the designs



ILC BDS optimization



R.Tomas, CLIC BDS optimization

ATF2

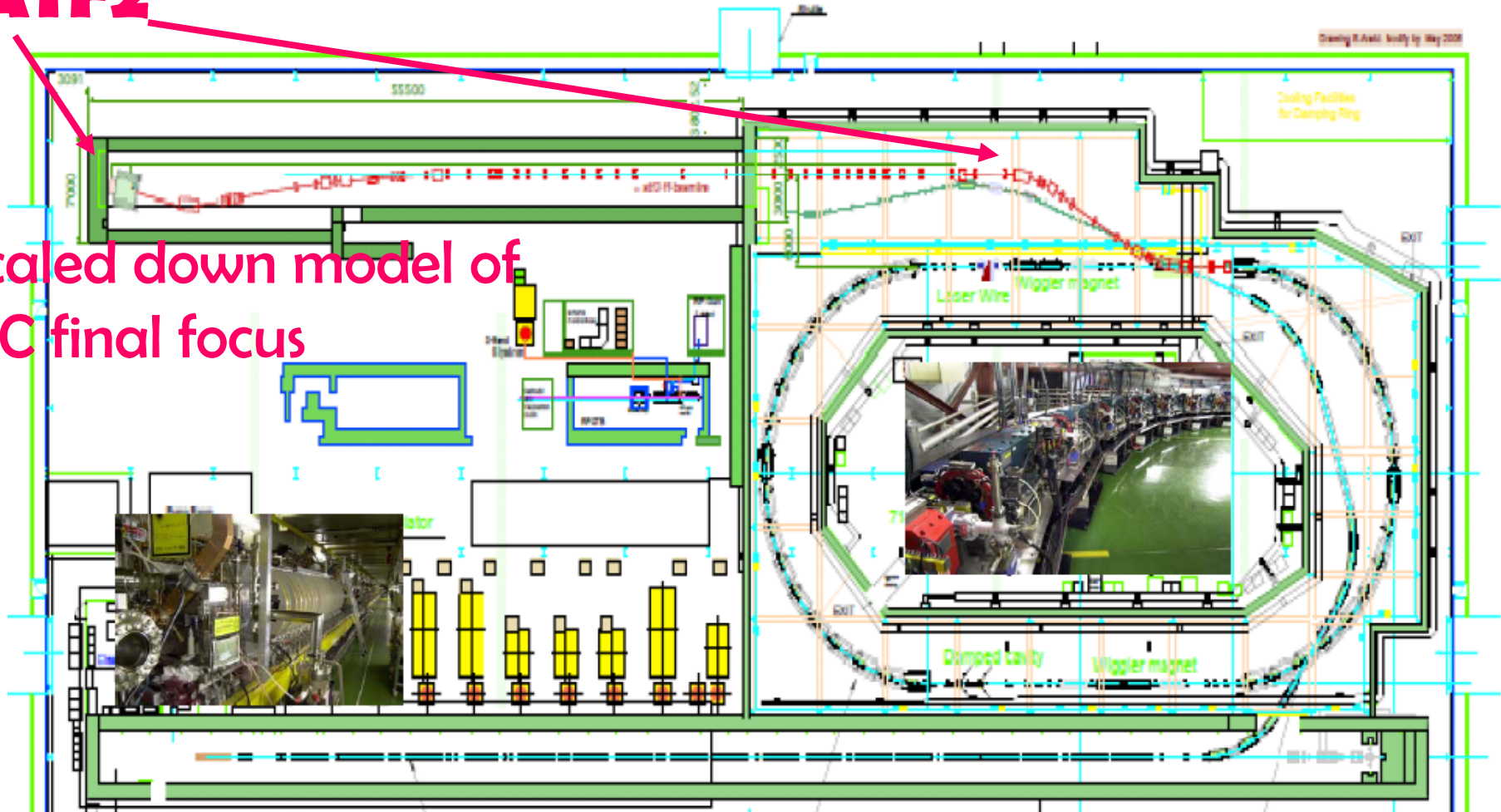
- Almost everybody is involved
- Already a global collaboration with both projects
- **Very small beta-functions**
- Tuning procedures
 - **Work started at CERN**
- Flight simulator
 - **Work started at CERN**
- Commissioning



ATF Accelerator Test Facility *at KEK*

ATF2

Scaled down model of
ILC final focus

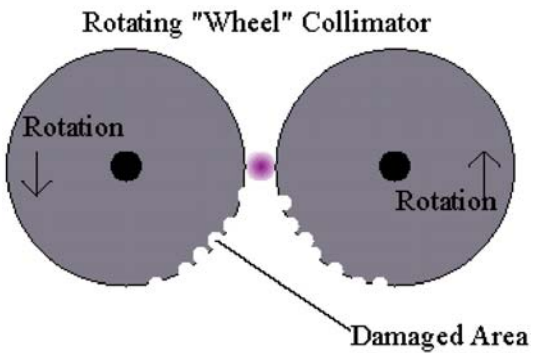


The ATF international collaboration include more than 200 researchers and the ATF MOU is signed by 20 institutions from all over the world

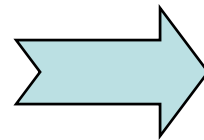
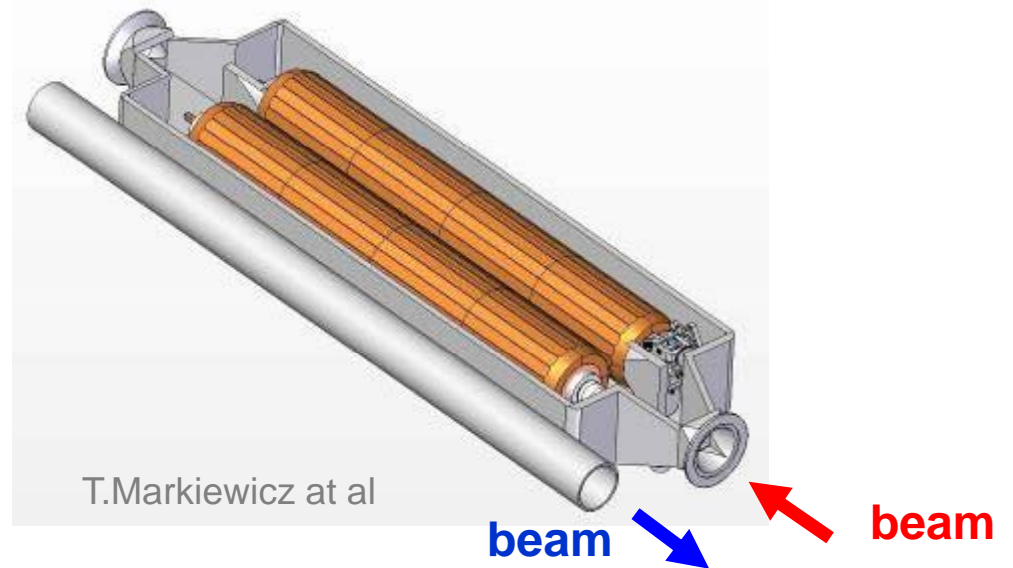
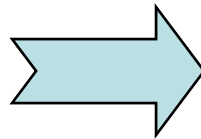
Collimators

- UK, CERN, SLAC
- Collimator survival is likely critical and limits system design
 - Collaboration LHC/ILC/CLIC on collimator hardware
- Collimator tests at ATF2/SLAC
- Extends beyond BDS
 - Machine protection
 - Other machines (LHC,...)
- Generic work on collimator materials
 - E.g. cristal collimation
- Wakefields

Collimation



- Consumable collimators developed for NLC
- Concept applied for LHC phase II collimation



- Will be studied for CLIC

Crab Cavity

- SLAC, FNAL, UK, CERN, INFN, KEK, FP7
- Design
- Phase stability
- Collaboration is ongoing to large extent
- Synergy with LHC upgrade
- FP7 proposal submitted

Beam Instrumentation

- Many institutes
- BPMs
- Laser wires
- Extraction line instrumentation
- Energy spectrometer including magnet
- Polarimeter
- Luminometers
- Orbit feedback design
- Intra-pulse IP feedback
- Generic tasks foreseen in FP7
 - BPMs
 - Laser wires

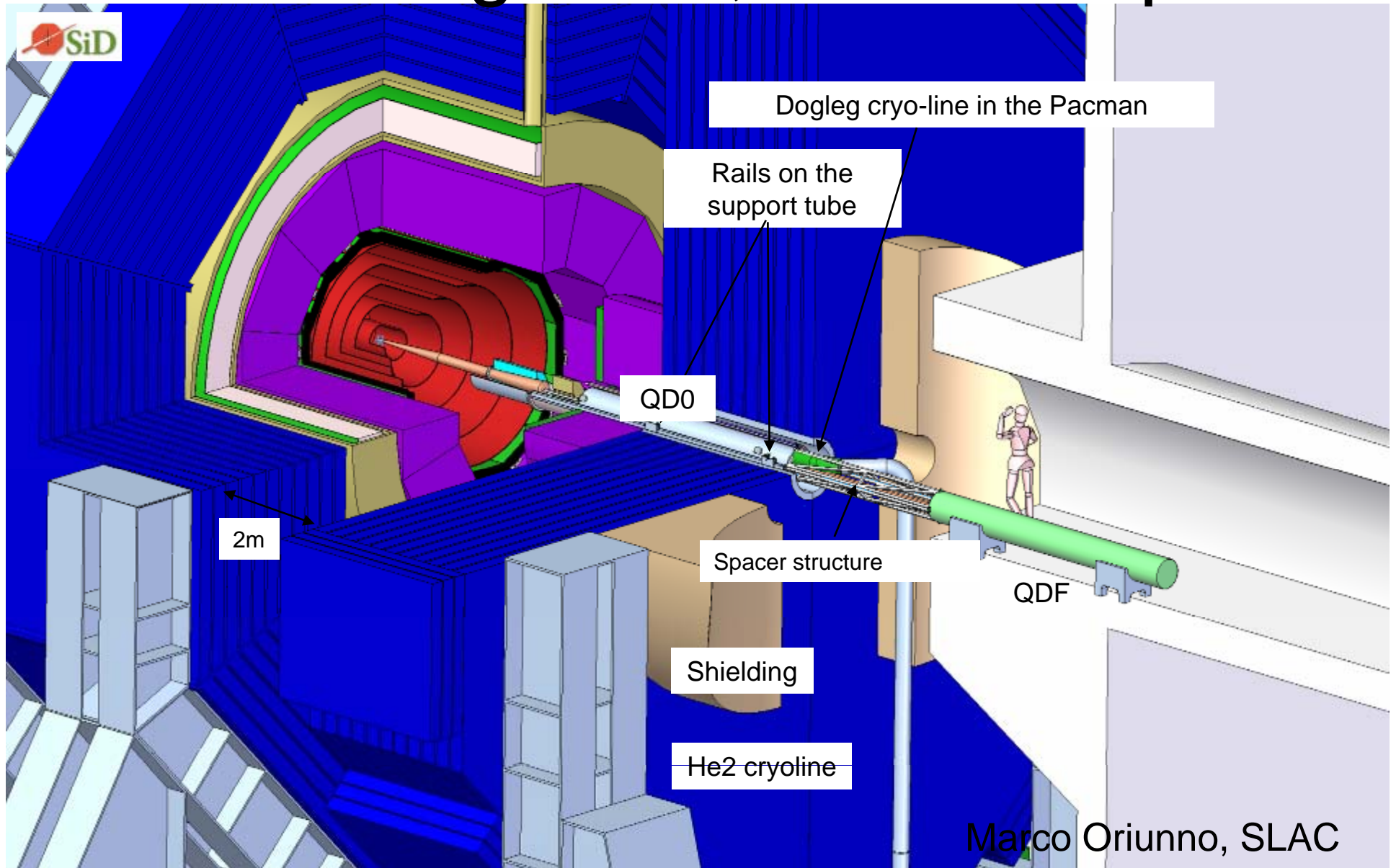
Potential Other Topics

- Beam pipe and vacuum system
- Beam dumps
 - Synergy with other projects
- Superconducting final doublet
 - Could be of interest for CLIC as well

Machine Detector Interface

- Many institutions
- General layout and integration
 - Common meeting/review required
 - Common engineering tools for detector design in preparation (DESY, CERN, IN2P3, FP7)
- Background and luminosity studies
 - Strengthen support
- Masking system
 - Constraints on vertex detector
- Detector field
 - Need a field for CLIC
- Magnet design
- Common simulation tools for detector studies
 - Need to review what is available
- Low angle calorimeter
- Beam pipe design (LHC)
- Vacuum etc. (LHC)

IR integration, SiD example



Background and Luminosity Studies

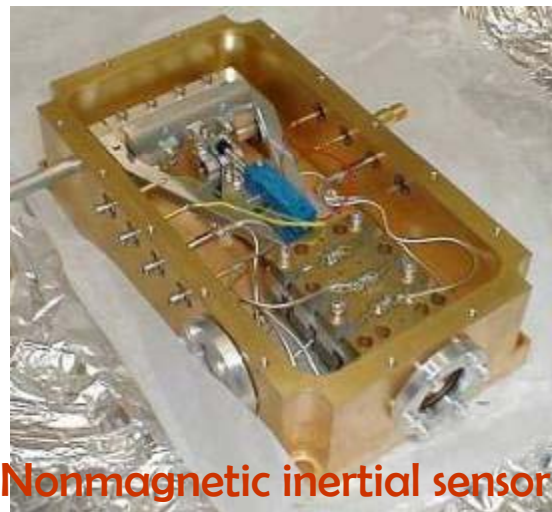
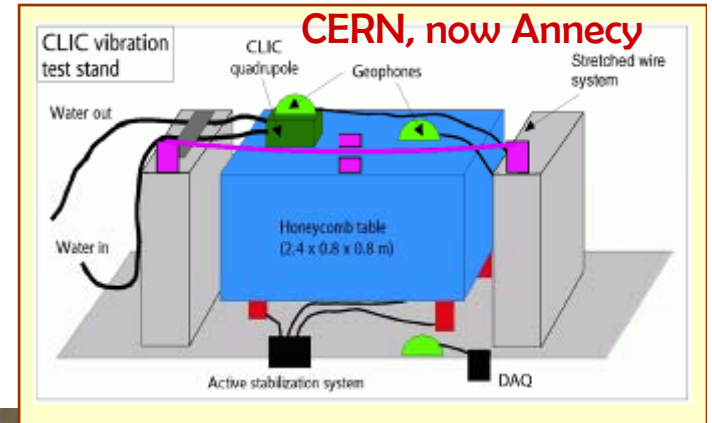
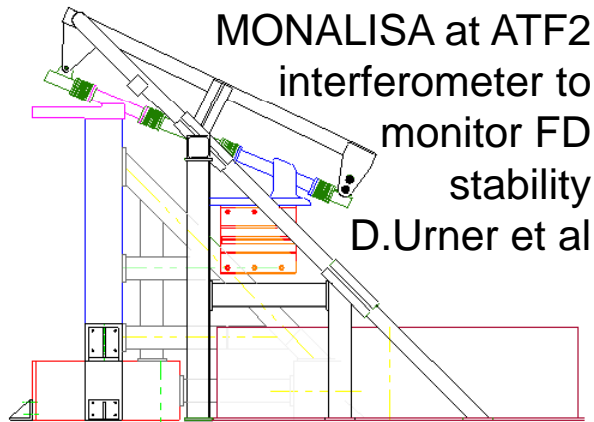
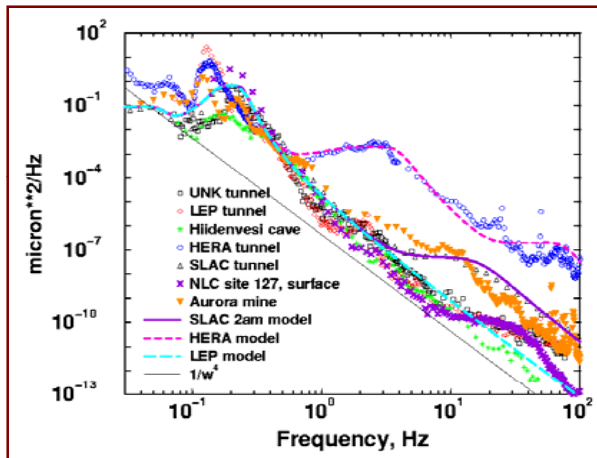
- Common simulation tools
 - BDSIM ()
 - Integration into GEANT?
 - FLUKA (CERN)
 - Agreed to help with code support
 - Halo and tail generation (CERN)
 - Common formats etc
- Study of machine induced background
 - In particular, neutrons, muons and synchrotron radiation
 - Mitigation strategies
 - e.g. tunnel fillers against muons
- Study of beam-beam background and luminosity spectrum

Support, Stabilization and Alignment

- LAPP, Oxford, CERN, FP7, BNL, SLAC, ...
 - Other please join
- Low-noise design
 - Noise level measurements (DESY, CERN)
 - Among others, measurements at LHC
 - Component design
- Mechanical design of quadrupole support
 - **Proposal from Andrei**
- Final quadrupole design
- Stabilization feedback design
 - Sensors
 - Actuators
 - Interferometers

Stability

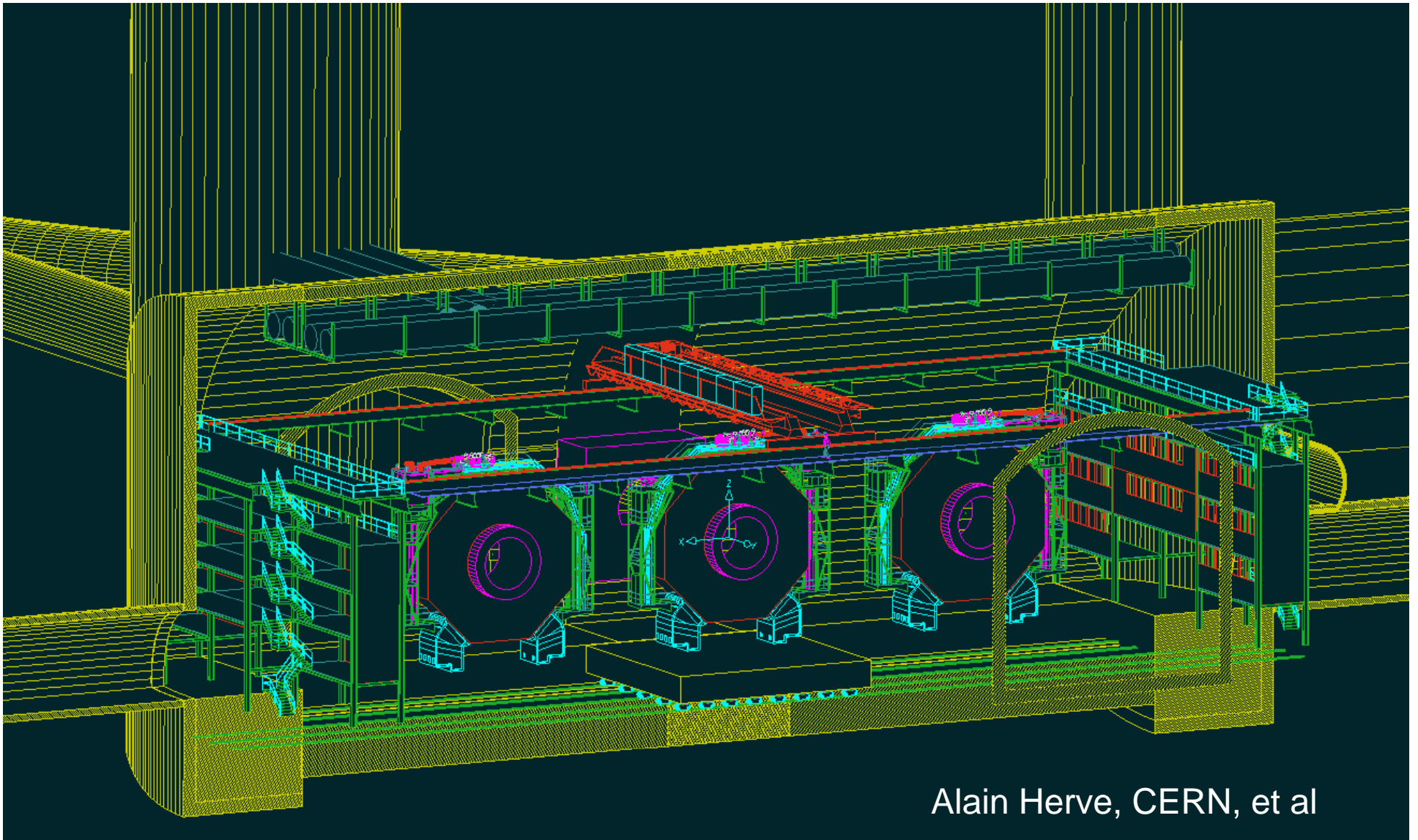
- Long history & potential for future joint developments



Experimental Area Integration

- Common definitions
- Infra-structure
 - Work is quite generic
 - No large differences expected for CLIC detector to some ILC detector
 - Collaboration has started
 - Emmanuel will go to Dubna
 - LHC expertise
- Push-pull
 - Is an option for both projects
 - A collaboration has started
 - Brings ILC/CLIC/LHC expertise
- Crossing angle
 - Investigate requirements
 - Then study benefits to find a common crossing angle

Push-Pull studies for two detectors



Alain Herve, CERN, et al

First Milestones

- Identify contact persons for different tasks
- Investigate what level of efforts and when could be available
- Have identified solutions for LHC that can be applied to ILC and CLIC
- Have identified solutions for ILC that can be applied to CLIC