Status of the CLIC physics & detector project

http://lcd.web.cern.ch/LCD/

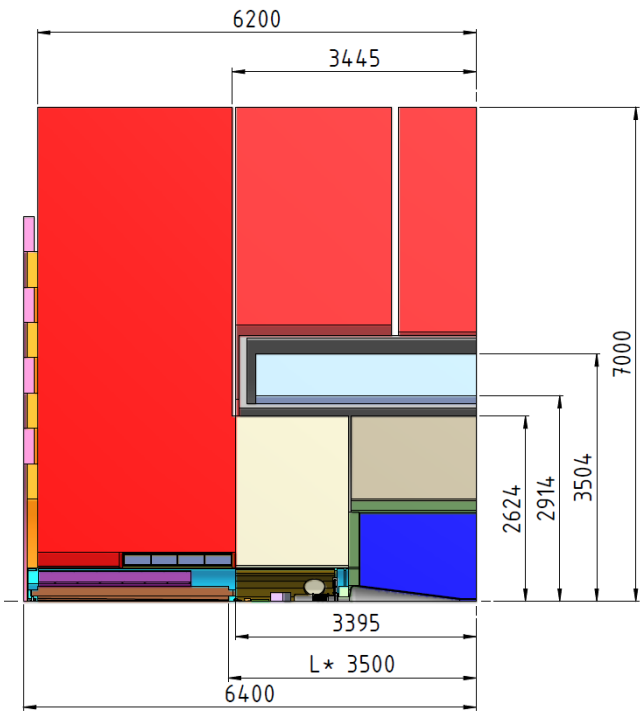
https://svnweb.cern.ch/trac/crdvol3

CDR Volume 2

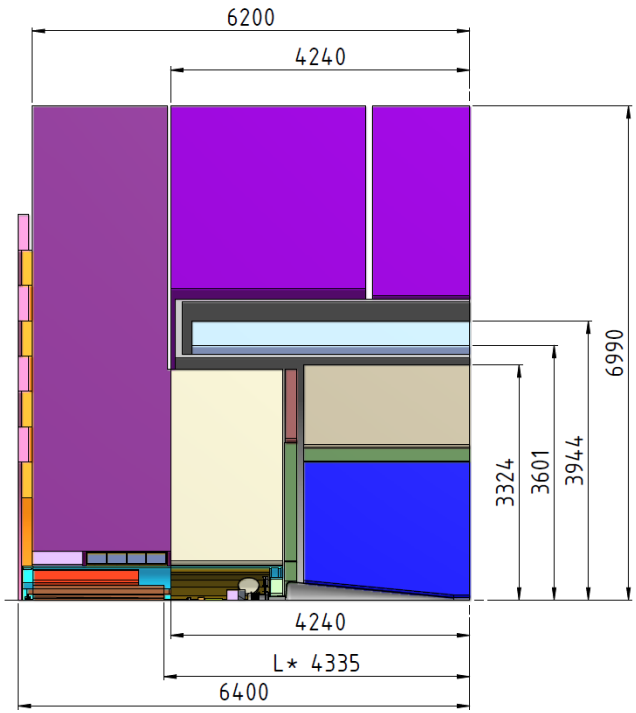
Principal aim: Describe the physics potential of a multi-TeV CLIC machine, and demonstrate that there are ways to measure the physics with good precision.

Use the two ILC detector concepts as a basis => adapt these concepts for CLIC

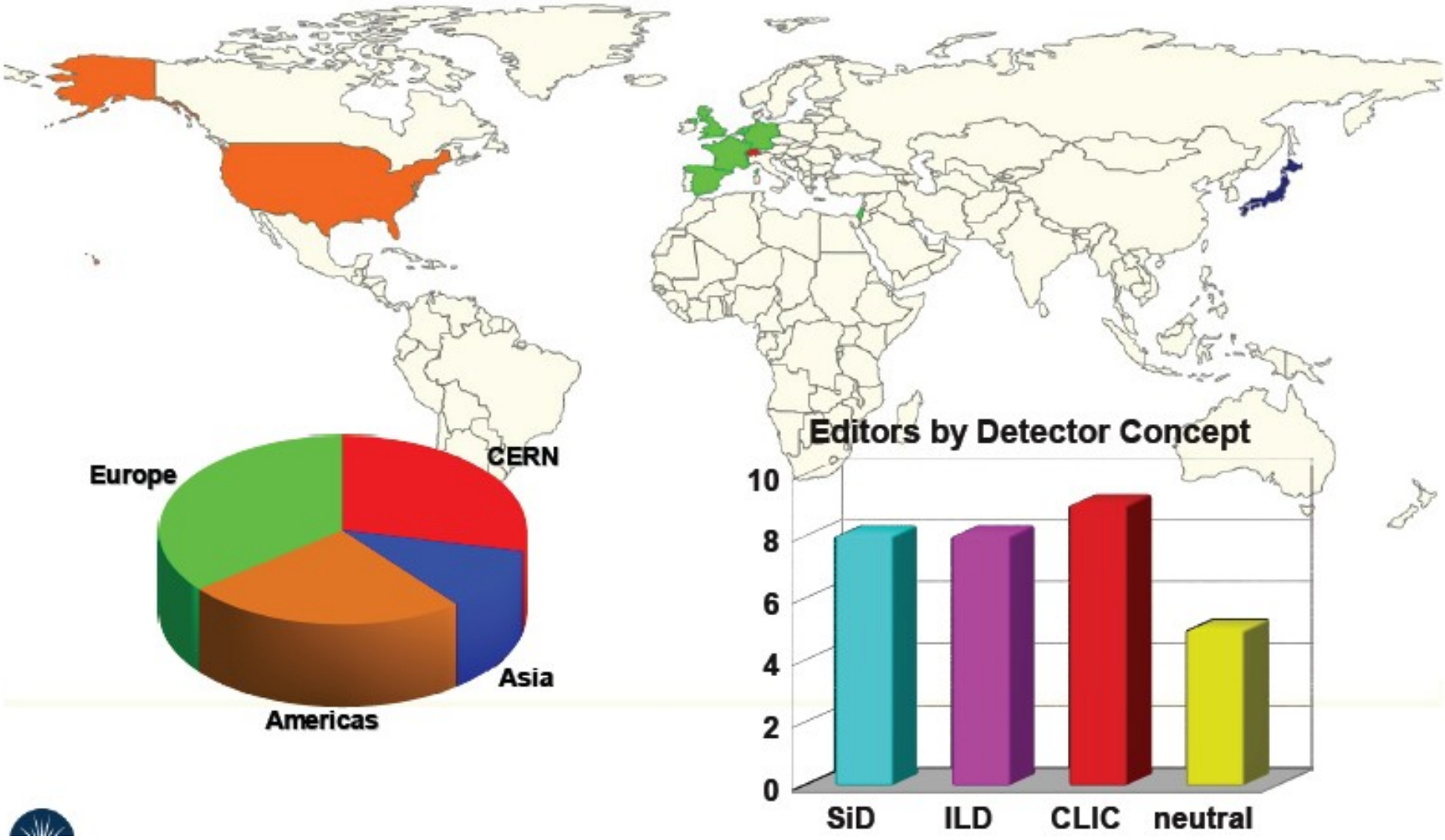
CLIC_SiD [5T]



CLIC_ILD [4T]



Editors of physics/detector CDR volume



Status of CDR editing (1)

Version 7/7/2011

Full chapter text exists in SVN	
Full chapter text exists	
Parts of the chapter text exist	
In beginning phase	
Spare chapter, due after Aug 2011	

Chapter #	Title	section #	Sub-title	Approx. page count
1	Introduction			3
2	CLIC physics potential			15
		2.1	Overview	
		2.2	Higgs boson physics	
		2.3	Supersymmetry	
		2.4	Alternative theories at the weak scale	
		2.5	Precision studies	
3	CLIC experimental conditions and detector performance requirements			20
		3.1	Signatures for Multi-TeV physics	
		3.2	Detector benchmark reactions	
		3.3	The CLIC experimental environment	
		3.4	Detector Requirements for e+e- physics at 3 TeV	
		3.5	Basic choice of detector concepts for CLIC	
		3.6	Detector requirements under CLIC experimental conditions	

Status of CDR editing (2)

4	Spare chapter on "physics requirements"			5
		4.1	Staged approach, Polarisation, Measurement of luminosity spectrum	
5	CLIC detector concepts			14
		4.1	Rationale	
		4.2	Design principles	
		4.3	Sub-systems	
		4.4	Detector parameters	
6	CLIC vertex detectors			10
		6.1	Vertex detector constraints and parameters	
		6.2	Detector technology and performance	
7	Tracking systems			15
		7.1	Introduction	
		7.2	Tracker concepts	
		7.3	CLIC_ILD tracker	
		7.4	CLIC_SiD tracker	
		7.5	Tracker performance	

Status of CDR editing (3)

8	Calorimetry			15
		8.1	A particle flow calorimeter for TeV energies	
		8.2	Electromagnetic calorimeter	
		8.3	Hadronic calorimeter	
		8.4	Calorimeter performance under CLIC conditions	
9	Superconducting solenoids and magnet systems			8
		9.1	Introduction	
		9.2	Magnetic field design	
		9.3	Solenoid coil design	
		9.4	Anti-solenoid design	
		9.5	Conductor options	
		9.6	Magnet services under push-pull scenario	
10	Muon systems at CLIC			6
		10.1	Introduction	
		10.2	Layout and technologies of yoke instrumentation systems	
		10.3	Muon detection perfomances	
11	Very forward			8
		11.1	Introduction	
		11.2	Lumical	
		11.3	Beamcal	
		11.4	Very forward calorimetry integration	
		11.5	Backscattering of particles from the very forward region	

Status of CDR editing (4)

12	Readout electronics and data acquisition			5
13	Interaction region and detector integration			15
		13.1	Introduction	
		13.2	Detector layout	
		13.3	Forwrad region and pre-alignment	
		13.4	Push-pull ooperation	
		13.5	Detector opening and maintenance	
		13.6	Underground experimental area	
14	Physics performance			20
		14.1	Simulation and reconstruction	
		14.2	Performance for physics observables	
		14.3	Performance for physics benchmark processes	
15	Future plans and R&D prospects			3
16	Detector cost			3
17	Conclusion			1
Appendix A	Software packages			4

Timeline of Volume 2 + Review

- The current official due-date for Volume 2 is "end of the year" for a presentation to SPC.
- For our physics/detector Volume 2, we have a due-date of end-August 2011. This comprises studies of 3 TeV CLIC, and some comparison with ILC at 500 GeV.

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- The period September => November 2011 will be used for:
  - Additions to the CDR, in particular the CLIC staged energy approach and possibly also a few “spare subjects”
  - An **internal review of the detector CDR, October 18+19+20**

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- Added value of the **scientific review** for our work:
  - Critical feedback on the CDR
  - Opportunity to bring in expertise from e.g. LHC, Tevatron, LEP etc.
  - An opportunity to make our work known

- 14-15 reviewers, review chair: Stefan Söldner-Rembold
- Venue: Manchester

CLIC staged energy approach (1)

- In preparation for:
  - European Strategy Update
  - CLIC staged energy approach

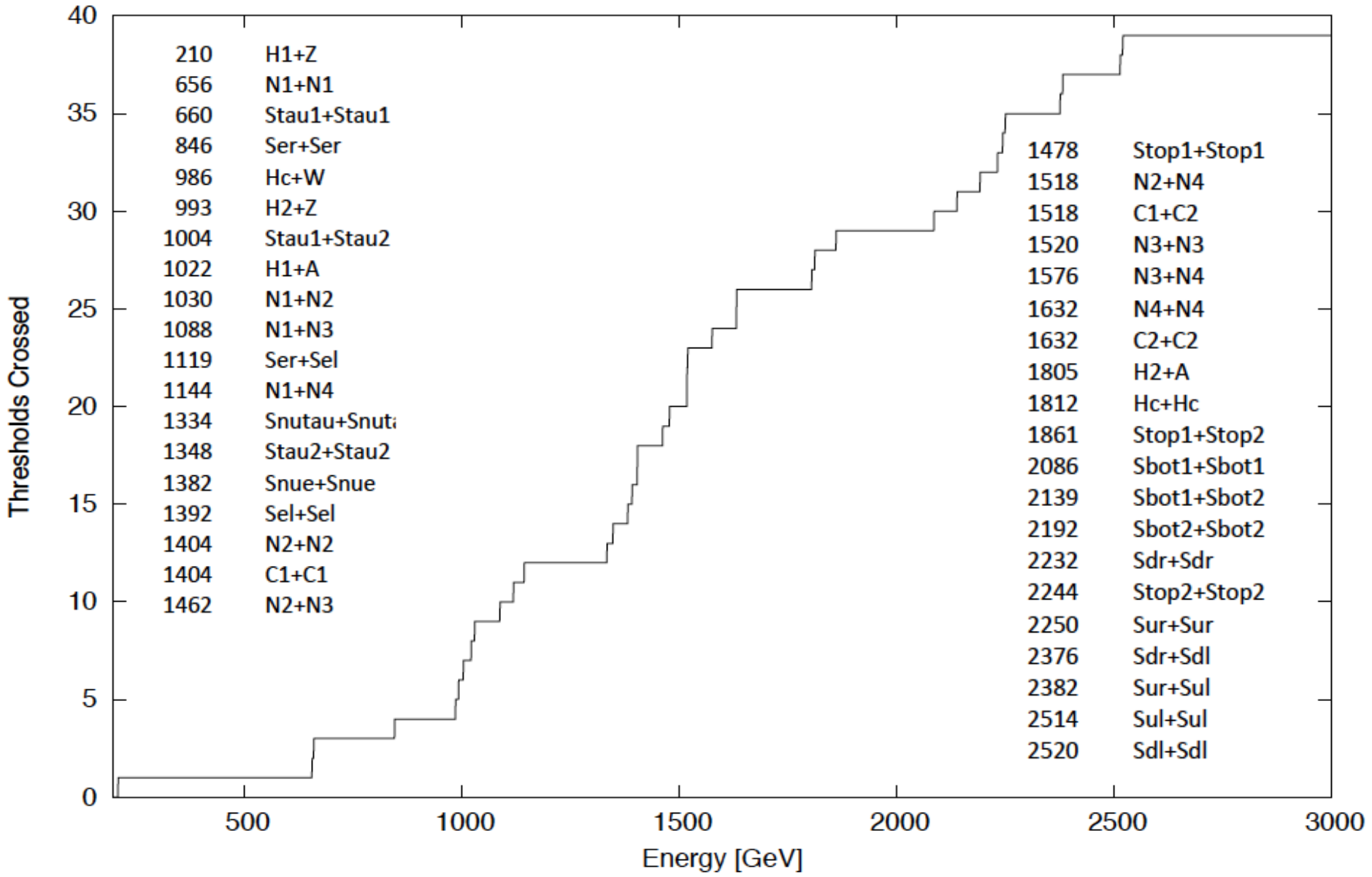
- Project to map out one complete SUSY model
  - LC (CLIC) contribution to the physics measurements
  - LHC contribution to the physics measurement
  - Emphasis on complementarity between LHC and CLIC
  - How the results impact on physics knowledge (e.g. symmetry breaking, dark matter etc.)

Initiative
James Wells

- SUSY model chosen by exparts from theory + expt. (mid Aug)
- Simulation work: late summer + autumn 2011

CLIC staged energy approach (2)

Example model: Thresholds Crossed as a function of Energy (GeV)



The CLIC physics/detector CDR is on schedule for the current due-date of end-August 2011 (principally 3 TeV case + one study at 500 Gev)