



SID

Beyond the DBD

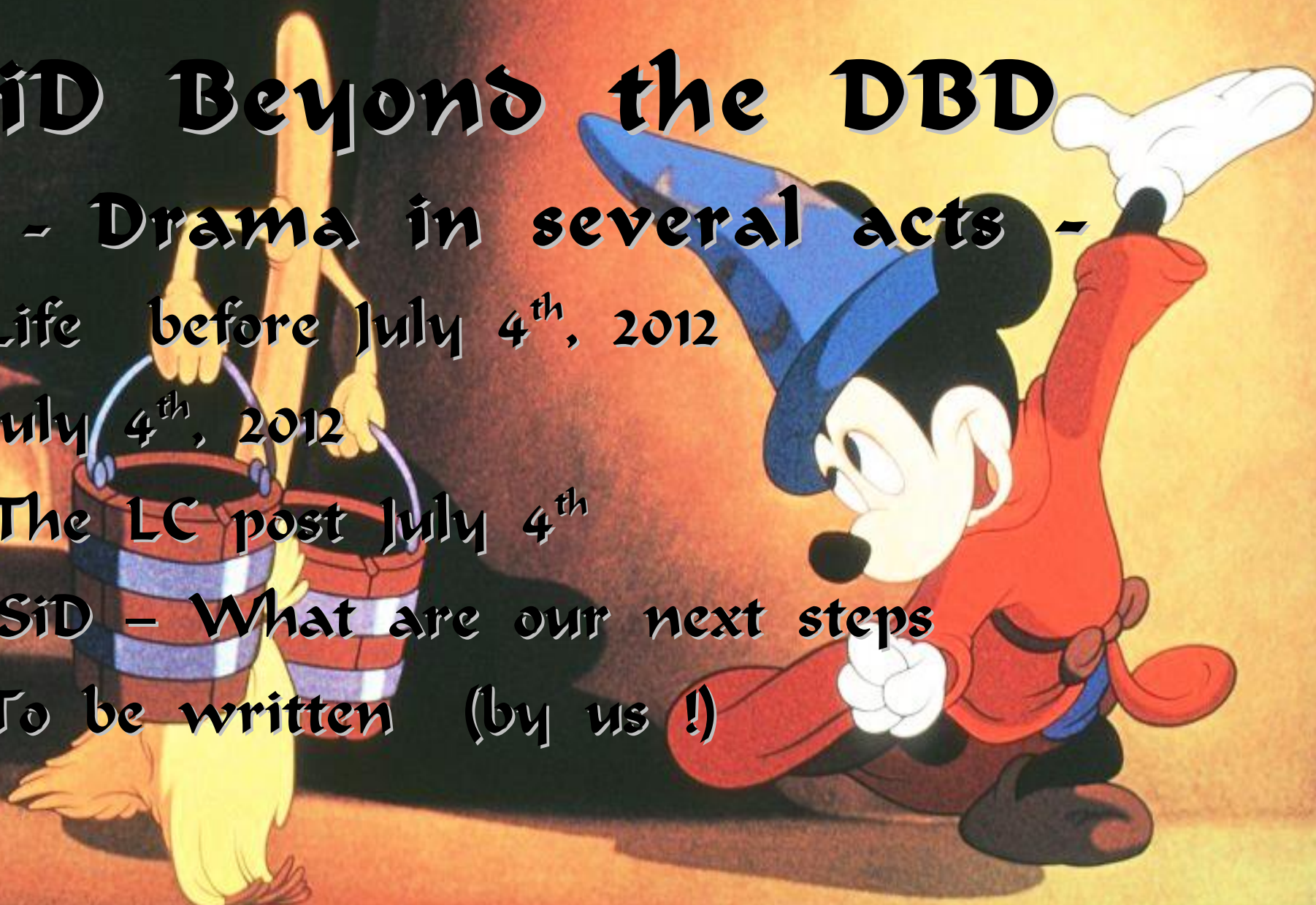
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SLAC 23/08/2012

SiD Beyond the DBD

- Drama in several acts -

- I. Life before July 4th, 2012**
- II. July 4th, 2012**
- III. The LC post July 4th**
- IV. SiD – What are our next steps**
- V. To be written (by us !)**





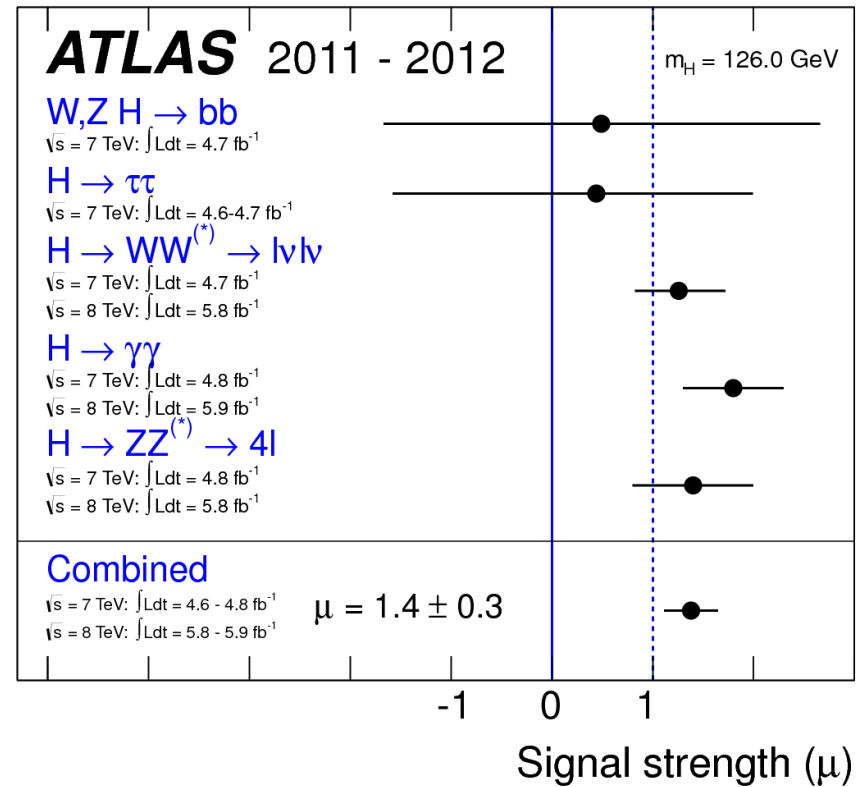
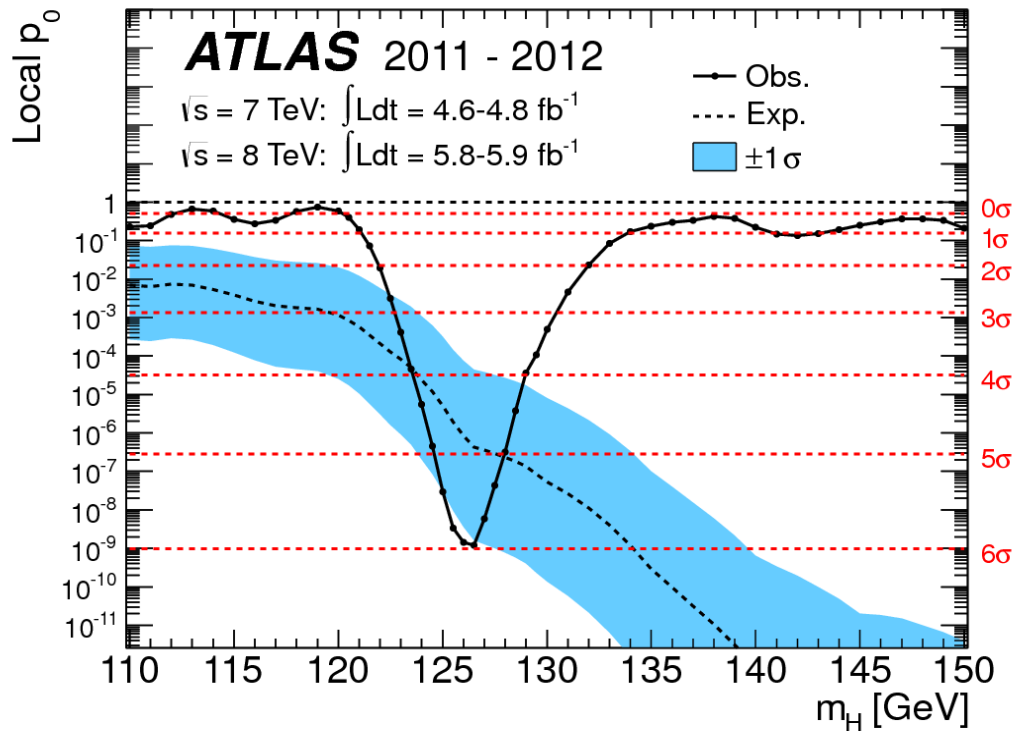
Before July 4th, 2012

- The Terascale was null and void
 - LHC has only set limits so far
- We've been writing many reports with many TLA's
 - An LoI for SiD@ILC Apr 2009
 - A CDR with SiD@CLIC(3 TeV machine) Dec 2011
 - A DBD Dec 2012
- No clear physics indications & directions
 - What energy & machine
 - What “killer” physics case
- Funding in the doldrums
 - Almost worldwide

But Japanese initiative to build the ILC in Japan



LHC has discovered a Higgs-like Boson !



$M_{H=} 126.0 \pm 0.4 \text{ (stat)} \pm 0.4 \text{ (sys)} \text{ GeV}$
 $\mu = 1.4 \pm 0.3 \text{ (SM Higgs boson hypothesis } \mu = 1)$



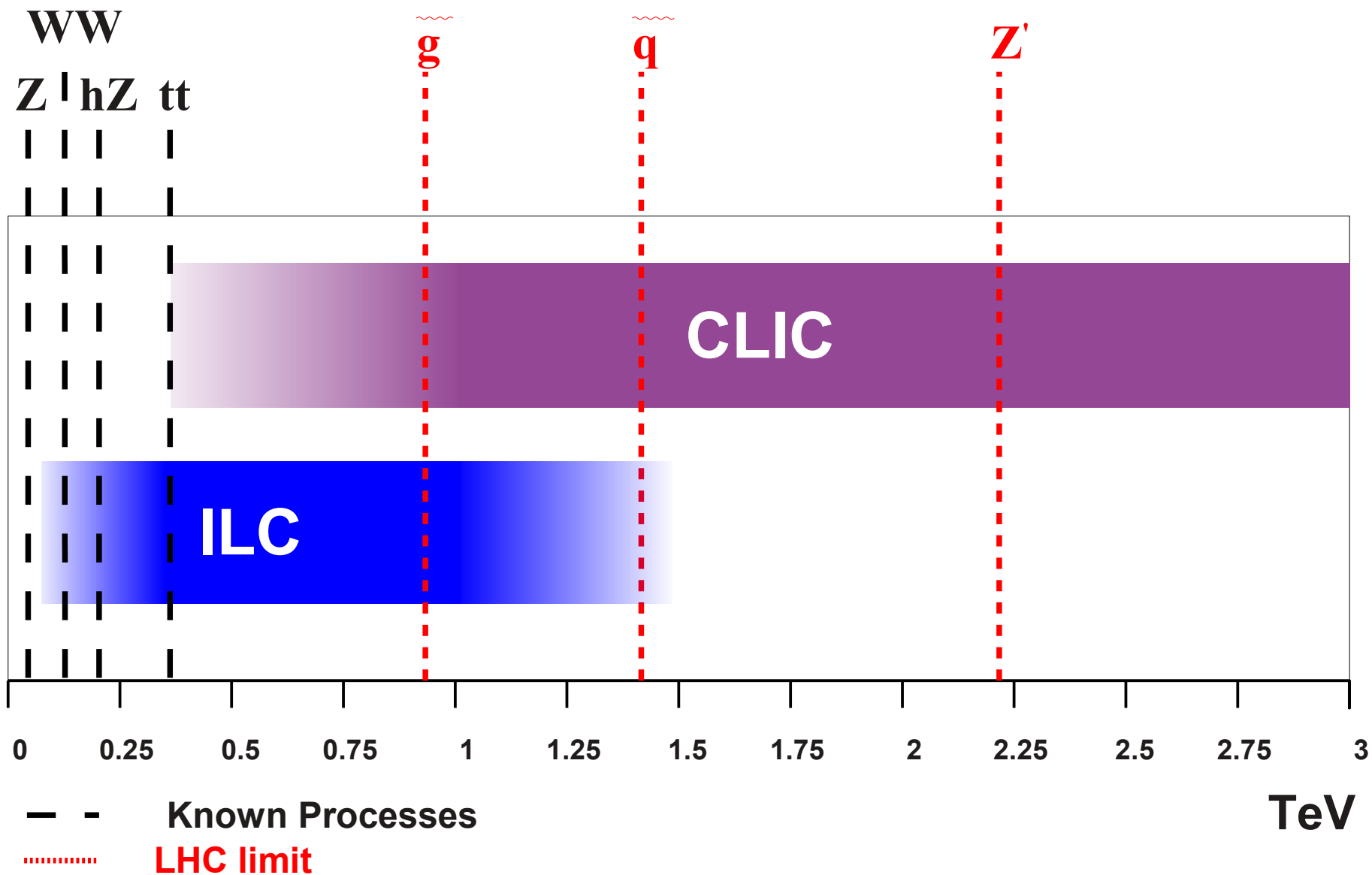
And now what ?

- Revived Interest in a linear collider to study the Higgs
 - The physics landscape has changed
- Japanese Initiative significantly strengthened
 - Keeps gaining momentum
- CLIC machine report now final (since this morning)
- ILC TDR is incoming
- No other news from LHC ...
 - No hints where to go ...





The landscape





My personal summary

- The Case for 250/350 GeV machine is strong
 - Guaranteed physics
 - Higgs precision measurements as window to Terascale
 - EW precision measurements
- Medium Energy Machine (~ 500 GeV)
 - Currently looks like there ain't much new there
 - But still decent chance for a few SUSY states (neutralinos, charginos, sleptons)
 - Study Higgs-Selfcouplings, ttH and ttZ
 - Clear Upgrade path for the 250/350 GeV machine





Cont'd

- Multi-TeV machines (1-3 TeV)
 - The current LHC results almost decouple a Higgs-Factory and a Multi-TeV machine
 - If nature is nasty, even a 3 TeV machine won't cover the entire SUSY spectrum
 - More data from LHC may dramatically change the picture
 - We need to keep studying this option, so we are ready if we need it
- A Staged Approach seems a natural choice
 - Science case is strong
 - Start with a Higgs/Top Factory and go from there
 - A linear collider can easily grow in energy, a synchrotron can't
 - Technology choice is also a question of time-scale
 - If we want a Higgs-centered program by ~ 2020 , need to get moving





What does it mean for SiD

- There is a window of opportunity for a big project at the energy frontier
 - My view : Odds are good to start with a 250/350 GeV machine
- We need to be ready
 - As a community to make this case worldwide
 - As a concept to become a real detector collaboration
 - As individuals and groups to make the argument with the funding agencies
- The next few years will be a transition phase
 - We need to actively prepare for it





The near time future

- Finalize the DBD (!)
- Deal with IDAG/PAC questions
 - Most likely we'll be asked for a “few more things”
 - Will probably keep us busy for a bit
- Prepare for Snowmass
 - There'll be quite some effort on physics benchmarks
 - Sharpen the physics case
 - Take latest LHC results on board
- SiD needs to make a strong showing at Snowmass





The role of the concepts

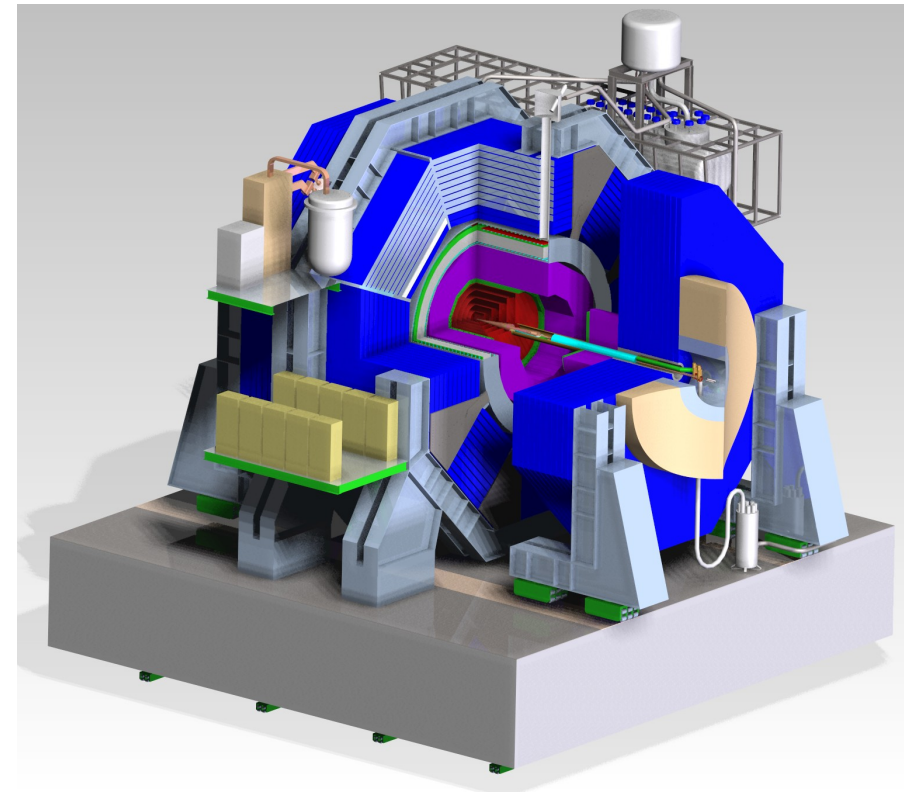
- The concepts fulfill a vital role
- A platform for people coming together
 - Meet and exchange ideas
- Test generic R&D ideas
 - Integrate their sub-detectors
 - Test the combined performance
- Physics studies
 - With a defined detector and common software
- Integration, MDI and civil engineering
 - Only possible with a real concept





Emphasizing SiD's strength

- We have a clear vision:
 - Silicon tracking
 - A compact high B-field detector
 - Designed for Particle-Flow
 - Cost-constrained
 - Rolling through the hall
- We are a well working concept
 - Produced many beautiful reports
 - And we still talk to each other ...
 - Lightweight governing structure
- We get things done
 - Have a good track record





Picking up the loose ends

- We didn't do all we wanted to do for the DBD
- So the next years we should finalize
 - R&D for core technologies
 - Optimization studies
 - Further benchmarks to illustrate physics performance
 - Revisit a few choices (pick your favorite)
- We gained momentum again
- At some point in the near future we need to write a TDR





Where we can improve

- Engaging the entire concept
 - Between Workshops not enough communication
 - People aren't aware what is going on
 - E.g. Strategy papers
 - **Action:** Revive and update SiD General Mailing list
- Representation of groups
 - Currently not all active groups are well represented in our structure (its mainly person-driven)
 - Example that comes to mind: CERN LCD group
 - We need to get them more involved, how ?
- Workshops
 - Is something which I think we do quite well ...
 - Feedback anyone ?





Attracting new collaborators

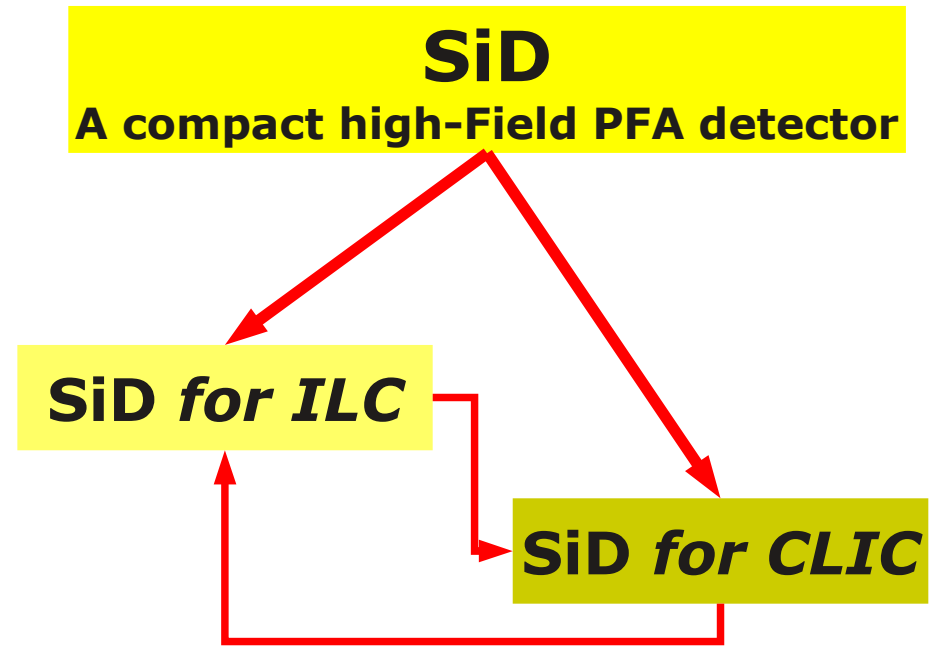
- Engaging them
 - Having a strong detector vision is great
 - It shouldn't deter others from joining
 - Keep doors open and let them bring their ideas on board
 - Must not appear like everything has been decided already
 - It's not about having option for the sake of having options
- Spreading the word
 - Reach out to the many LHC groups not involved yet
- Breaking up the regional divide
 - The current regional division between ILD and SiD is merely historic
 - How do we fix this ?





SiD, CLIC and all that

- SiD is a detector concept
 - No matter which machine
 - All groups working on aspects of SiD are naturally members of the SiD concept
- We're working well together
 - CDR was a big success
 - But need to do think about next step
- Differences in structure between ILC-Land and CLIC-land
 - In some ways the well known "Cathedral vs. Bazaar" phenomenon

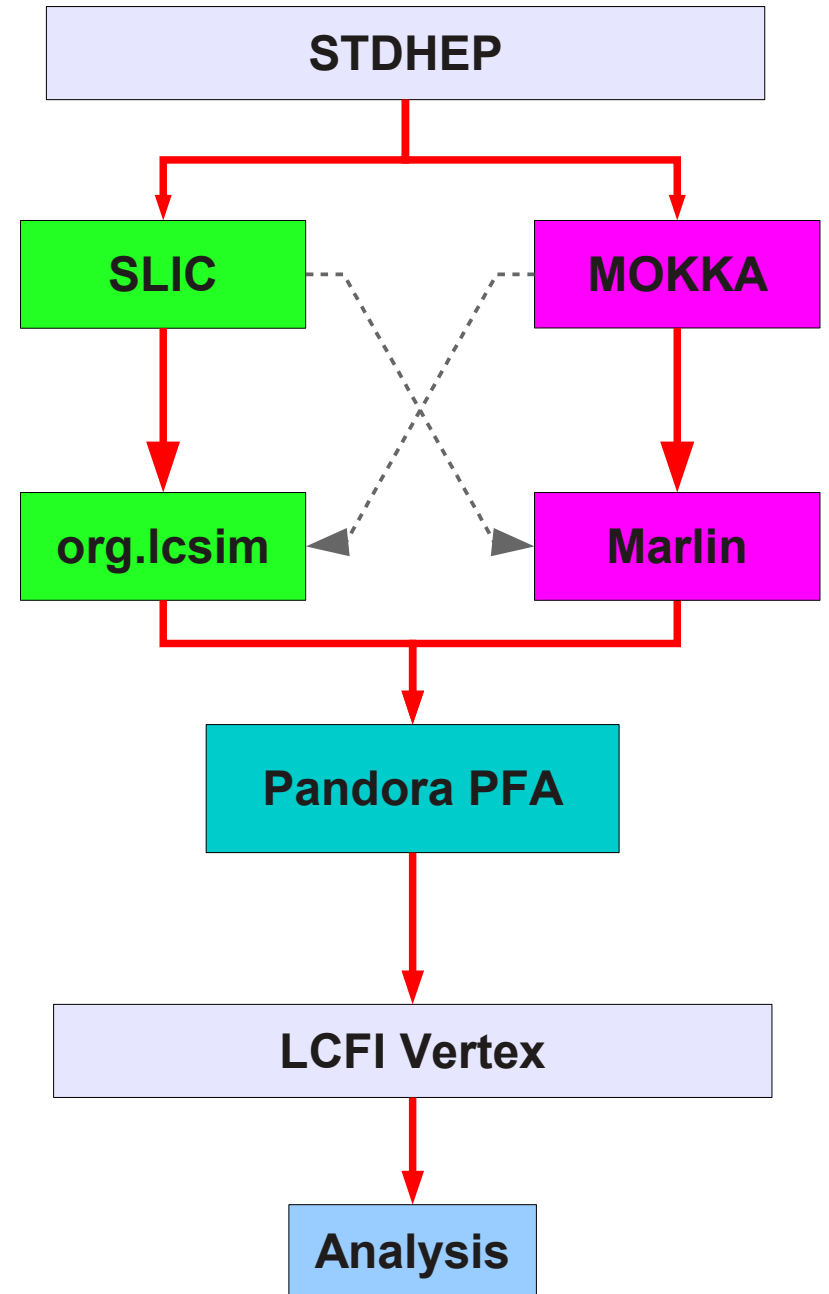




Software

- Our Software has served us well so far
 - But it needs maintenance
- Global Problem of shrinking support
 - Same for ILD
- Already sharing many items
- It's not a question of the better solution right now
 - That'd be easy
- LHC people come with different background
 - ROOT/C++

Simulation
Reco
PFA
Vertexing





Make the case

- For SiD & Linear Colliders
 - Only the LC delivers the required precision
- Attend the strategy meetings
 - EPS Strategy session in Krakow September 2012
 - Snowmass (Summer 2013)
- There will be a lively discussions
 - HL-LHC vs. LEP3 vs. ILC
- Take up effort of giving talks & seminars again
 - Spread the word about SiD, Linear Colliders



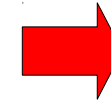
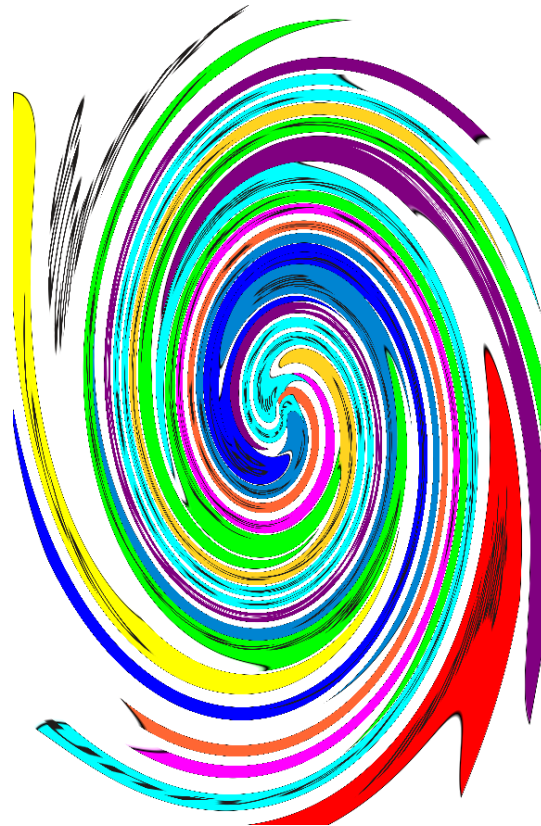
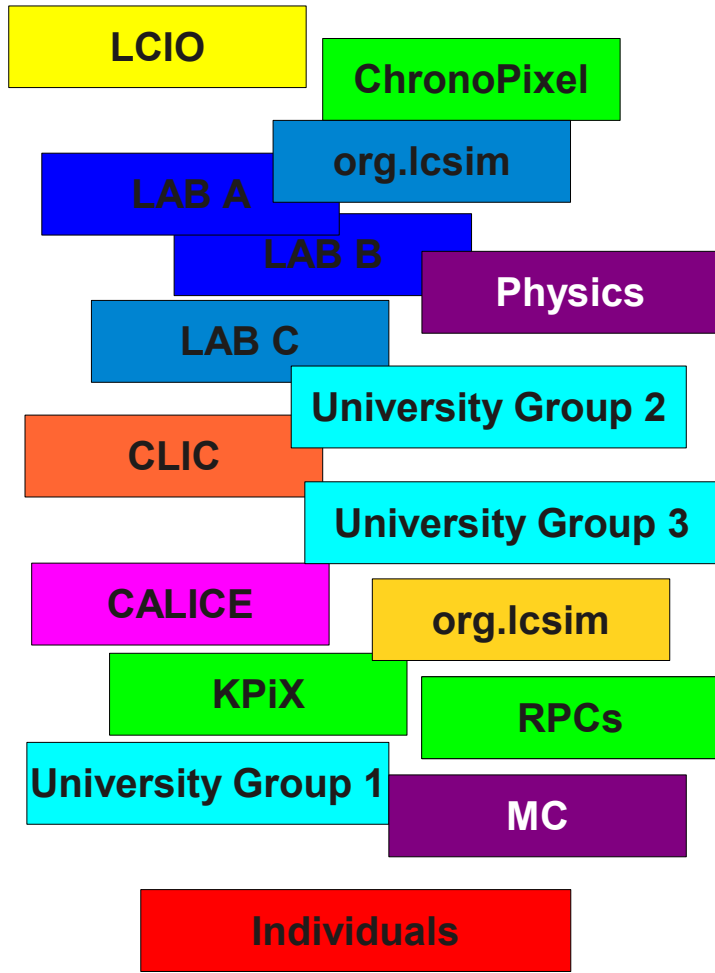


Diagonalizing the Matrix

SiD Concept -2012

Transition phase 2013-201X

SiD Collaboration 201X-



- From my December slides quoting Michael Peskin:

The announcement of the Higgs discovery will be a magic time when we have the world's attention. Everyone will ask, what is next ?

If the technical proposal is not ready, the moment is lost.

- That moment is there
 - The DBD is a stepping stone
 - Let's get it done !
- And hope for the best !