Precision of Higgs couplings

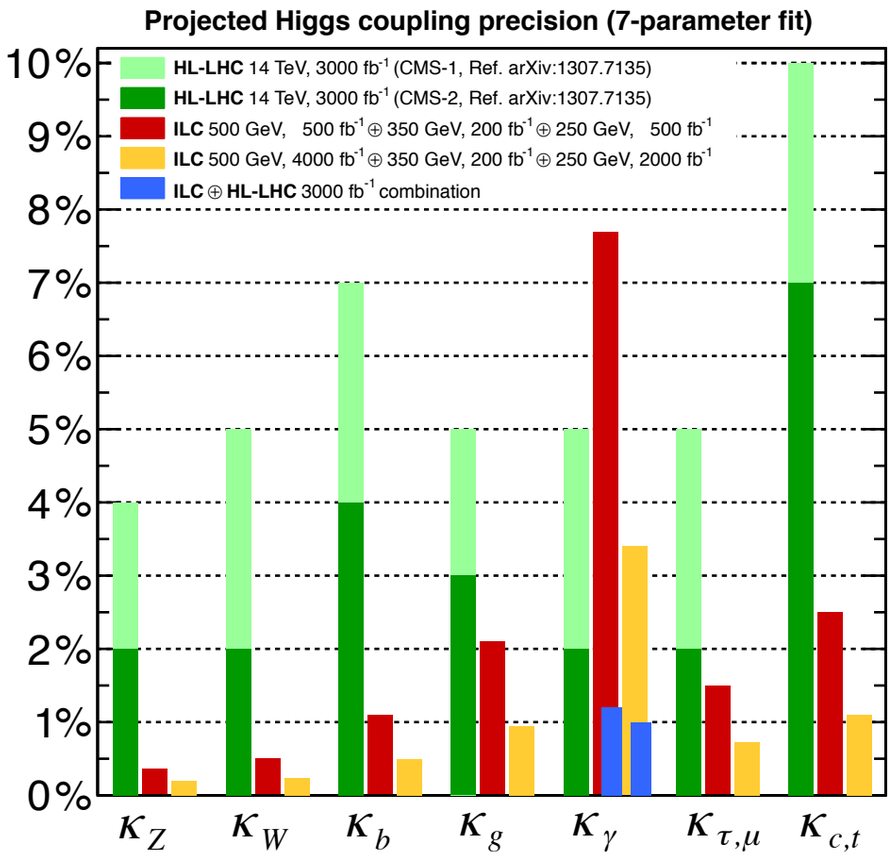


Figure 4: Relative precisions for the various Higgs couplings extracted using the model-dependent fit used in the Snowmass 2013 study [18], applied to expected data from the High-Luminosity LHC and from the ILC. Here, κ_A is the ratio of the $A\overline{A}h$ coupling to the Standard Model expectation. The red bands show the expected errors from the initial phase of ILC running. The yellow bands show the errors expected from the full data set. The blue bands for κ_γ show the effect of a joint analysis of High-Luminosity LHC and ILC data.

model independent fit

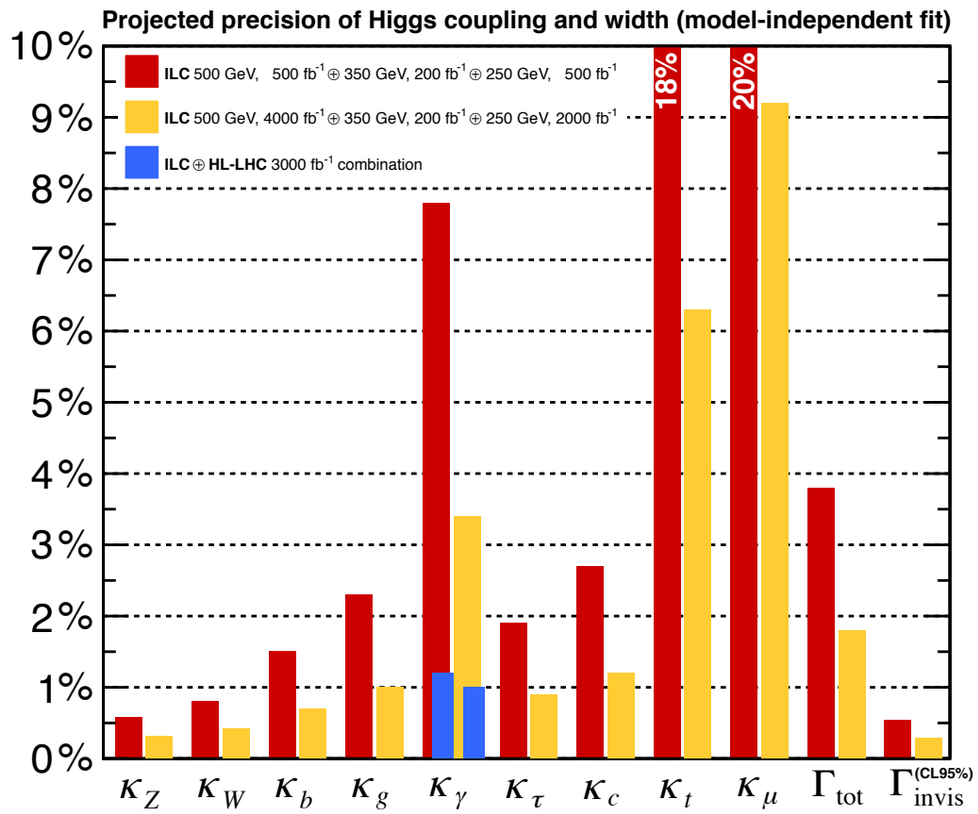
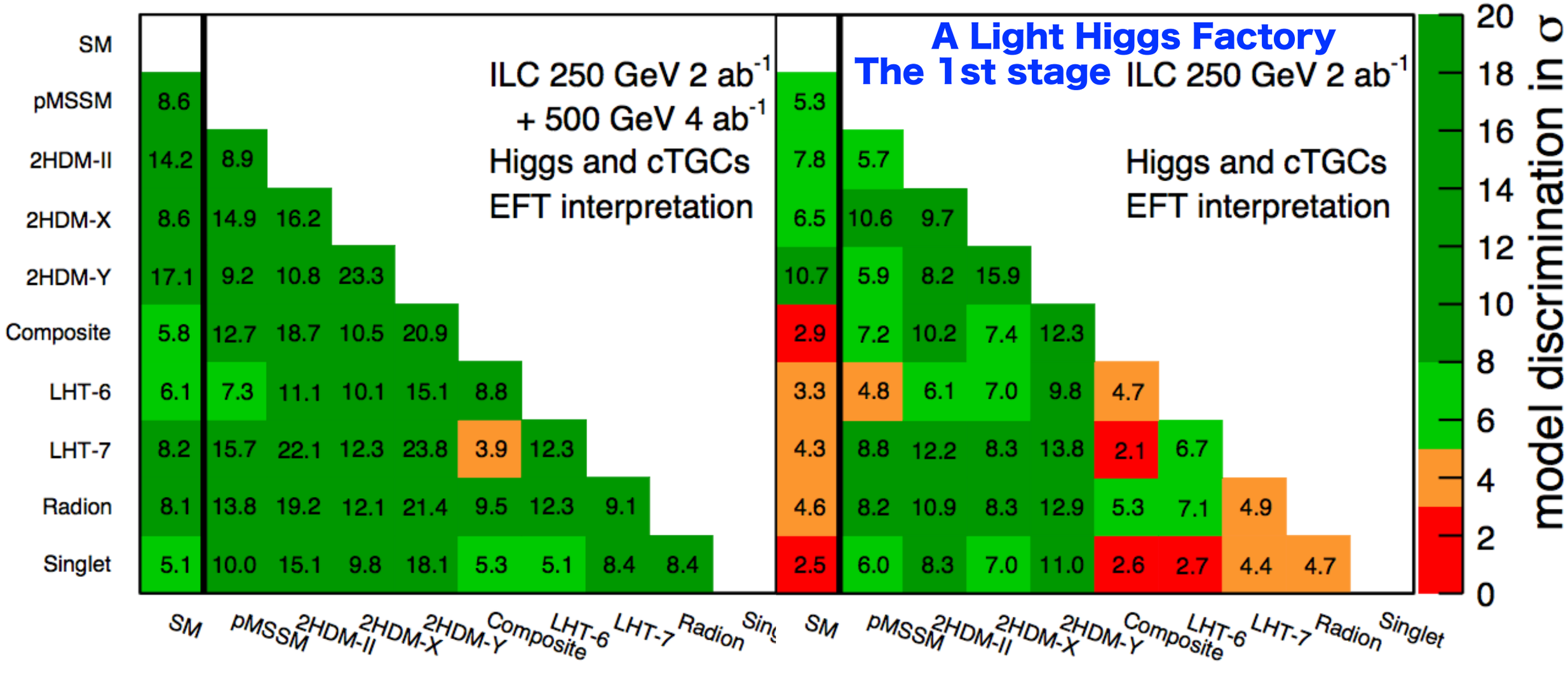


Figure 5: Relative precisions for the various Higgs couplings extracted from a model-independent fit to expected data from the ILC. The notation is as in Fig. 4.

What is the BSM ?

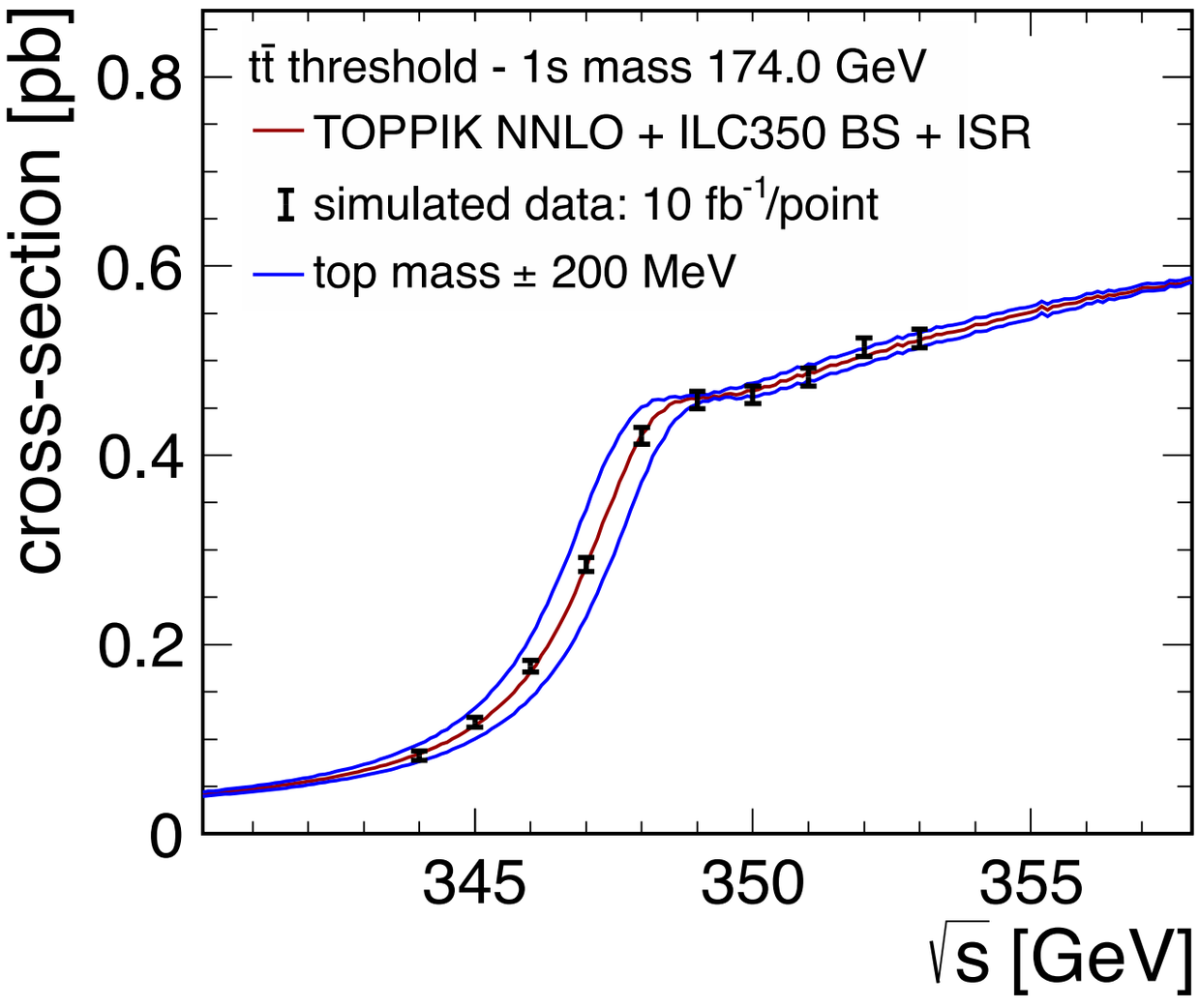
Discrimination between various models by “Higgs”

- Standard Model (SM) and Beyond the Standard Models (BSM) -



TOP quark production at the threshold

Is it an elementary particle ?



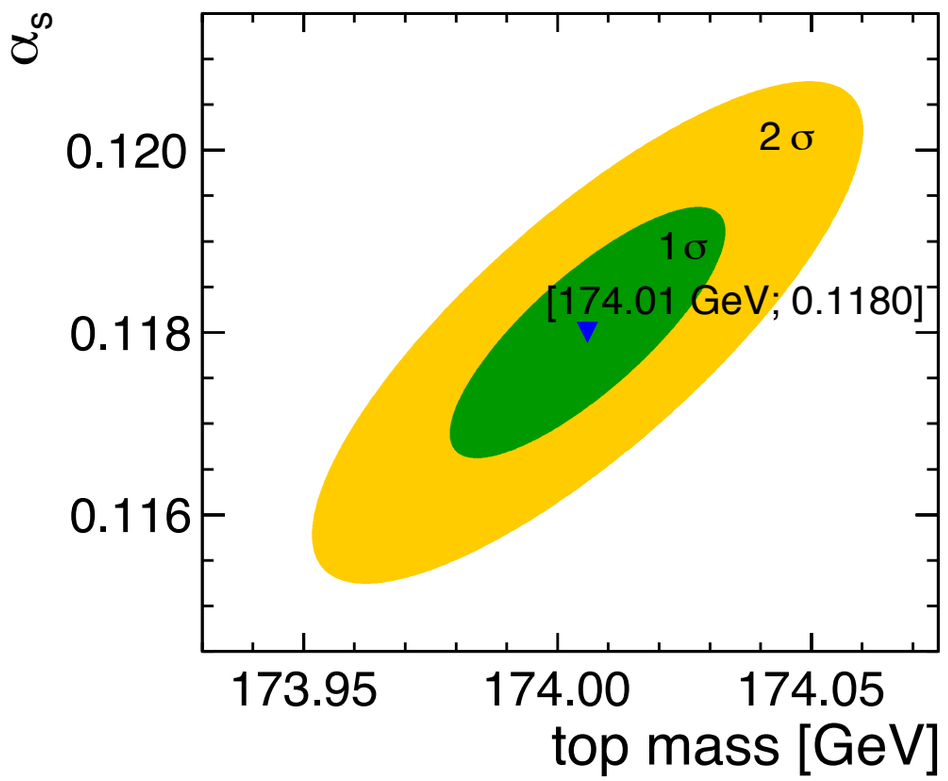
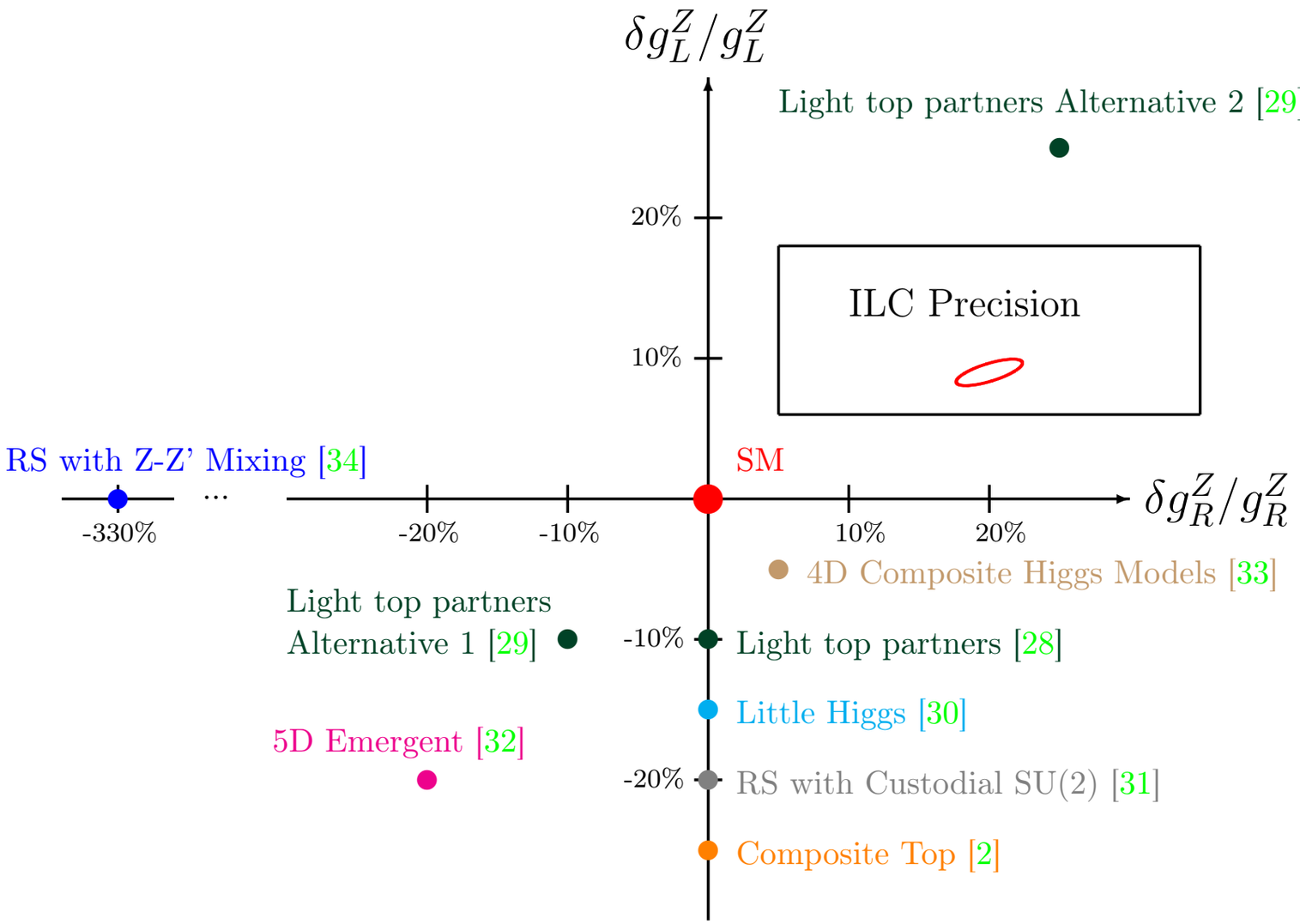
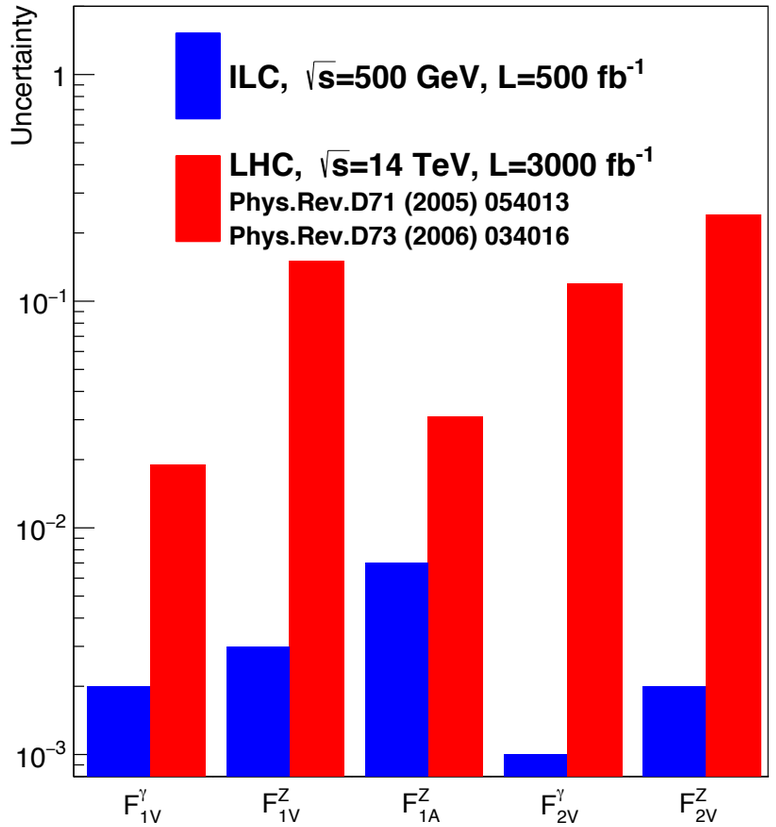


Figure 5.2. Illustration of a top quark threshold meausurement at the ILC. In the simulation, the top quark mass has been chosen to be 174. GeV. The blue lines show the effect of varying this mass by 200 MeV. The study is based on full detector simulation and takes initial state radiation (ISR) and beamstrahlung (BS) and other relevant machine effects into account: (left) the simulated threshold scan. (right) error ellipse for the determination of m_t and α_s. From [34].

What is the BSM ?

TOP quark acts as a messenger to new physics





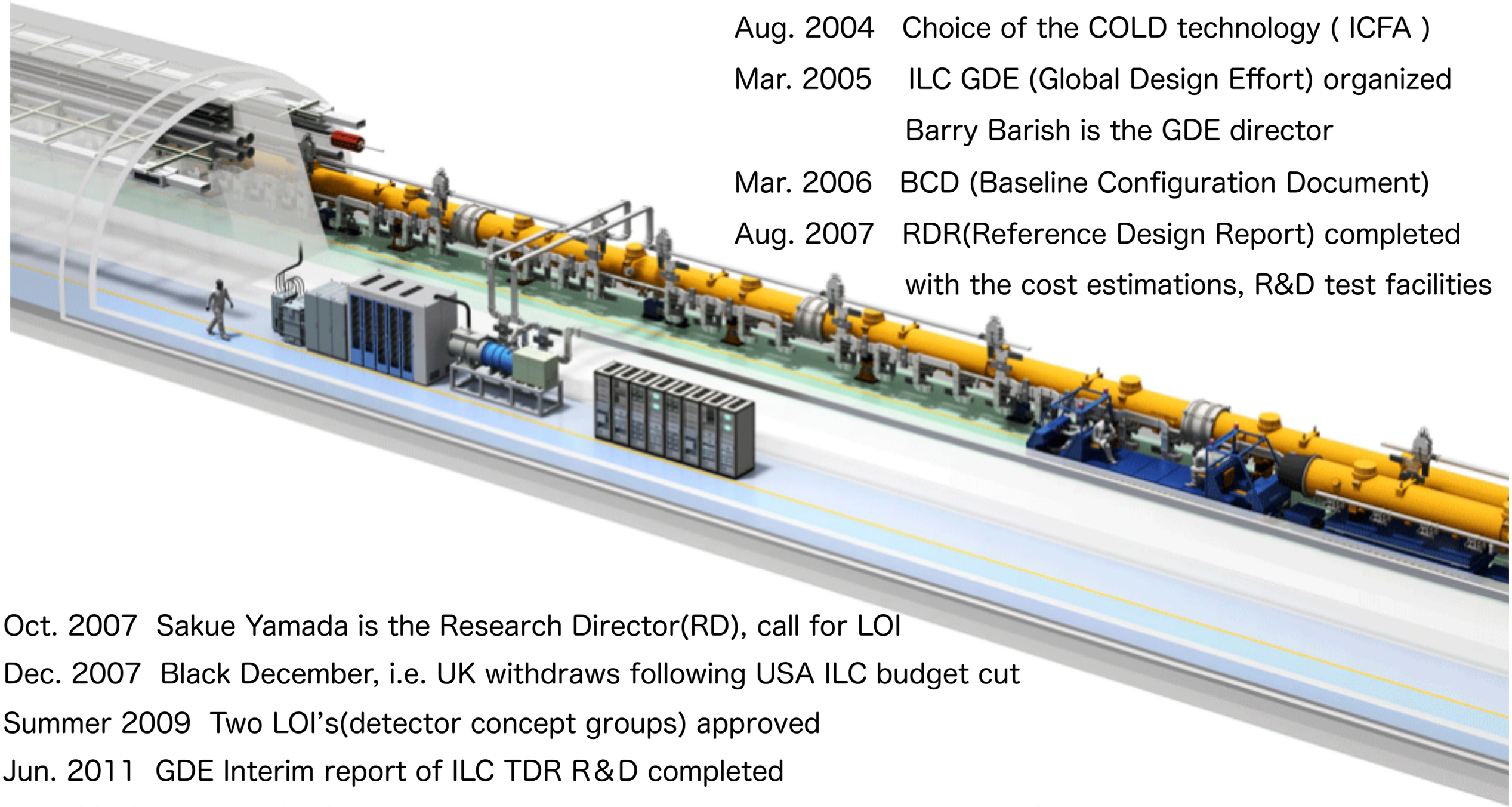
CP conserving form factors

Figure 3: *Predictions of several models that incorporate Randall-Sundrum (RS) models and/or compositeness or Little Higgs models on the deviations of the left- and right-handed couplings of the t quark to the Z^0 boson. The ellipse in the frame in the upper right corner indicates the precision that can be expected for the ILC running at a centre-of-mass energy of $\sqrt{s} = 500$ GeV after having accumulated $\mathcal{L} = 500\,fb^{-1}$ of integrated luminosity shared equally between the beam polarisations $\mathcal{P}_{e^-}, \mathcal{P}_{e^+} = \pm 0.8, \mp 0.3$. The original version of this figure can be found in [35].*

M.S. Amjad et al., arXiv:1505.06020

International Linear Collider(ILC)

31km long Linear accelerator based on the SC-RF



Aug. 2004　Choice of the COLD technology (ICFA)

Mar. 2005　ILC GDE (Global Design Effort) organized

Barry Barish is the GDE director

Mar. 2006　BCD (Baseline Configuration Document)

Aug. 2007　RDR(Reference Design Report) completed

with the cost estimations, R&D test facilities

Oct. 2007　Sakue Yamada is the Research Director(RD), call for LOI

Dec. 2007　Black December, i.e. UK withdraws following USA ILC budget cut

Summer 2009　Two LOI's(detector concept groups) approved

Jun. 2011　GDE Interim report of ILC TDR R&D completed

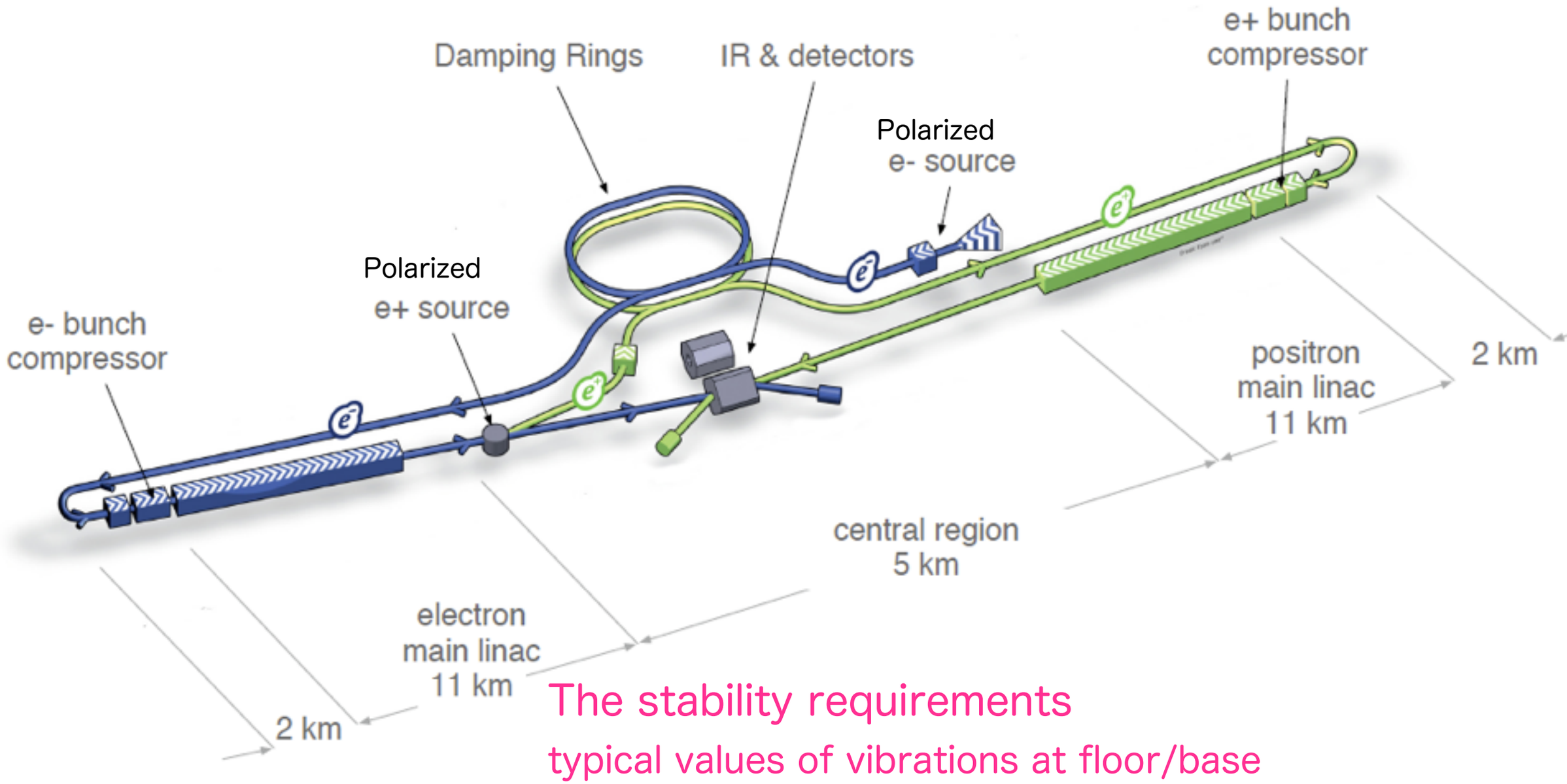
Dec. 2012　Final draft of TDR with the Detailed Baseline Design Report(DBD for the detectors)

Feb. 2013　GDE resolved and Linear Collider Collaboration (LCC) organized, Lyn Evans is the LCC director

Jun. 2013　TDR completed

ILC TDR Layout

The center of mass energy of 500GeV



The stability requirements

typical values of vibrations at floor/base

(1) Main Linac : < 100nm at freq. >1Hz

(2) IP (detector hall) : rel.(V,rms) < 50nm between 2 FDs

the IP vertical/horizontal beam sizes of 5.9/474nm