

HIGG PHYSICS WITH ILC

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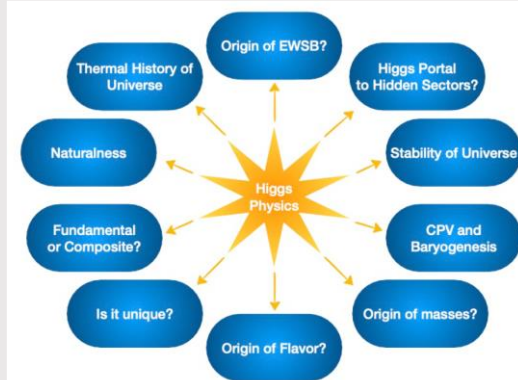
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On behalf of the ILC International Development Team Detector & Physics Working Group

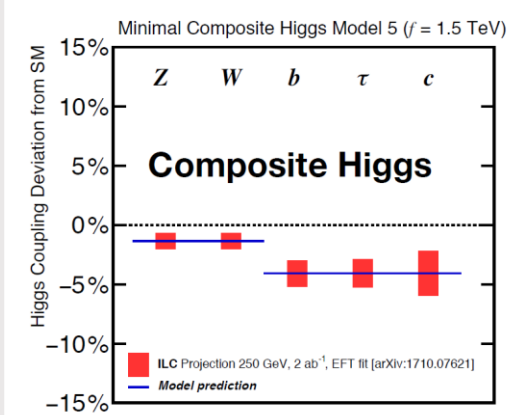
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HIGHLIGHTS OF THE ILC HIGGS PHYSICS PROGRAM

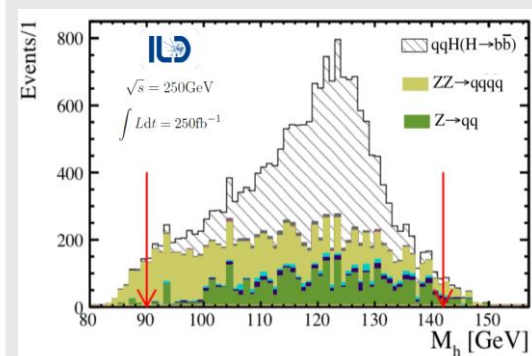
THE LEAST UNDERSTOOD SECTOR OF THE SM



NEW PHYSICS CALLS FOR PRECISION



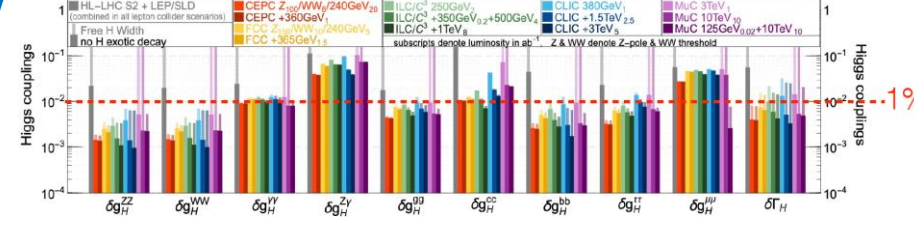
IT'S NOT ONLY STATISTICS THAT MATTERS



Same significance (5σ) for $H \rightarrow bb$, with 100 times less events than at 13 GeV LHC [1].

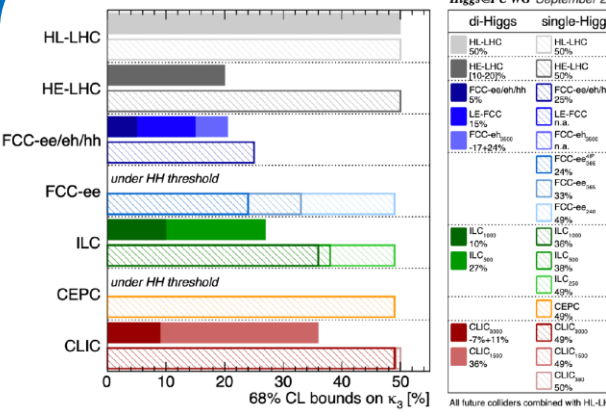
1. ATLAS arXiv:1808.08238; CMS arXiv:1808.08242, T. Ogawa, PhD thesis, 2018;
2. Snowmass White Paper on Global SMEFT Fits, arXiv: 2206.08326;
3. Liu, Wang, Zhang, arXiv: 1612.09284;

EFT fit: precision reach on effective Higgs couplings from SMEFT global fit



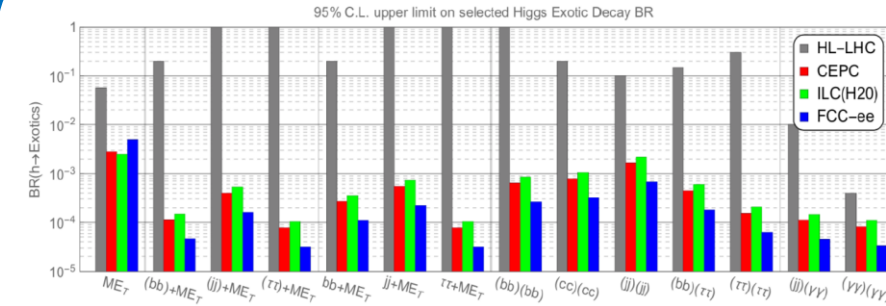
- EFT: Smaller the uncertainty – larger the NP scale to be probed ($\sim 1/\Lambda^2$) independently of a particular model;
- Most couplings can be probed below 1% relative statistical uncertainty [2];

Higgs self-coupling



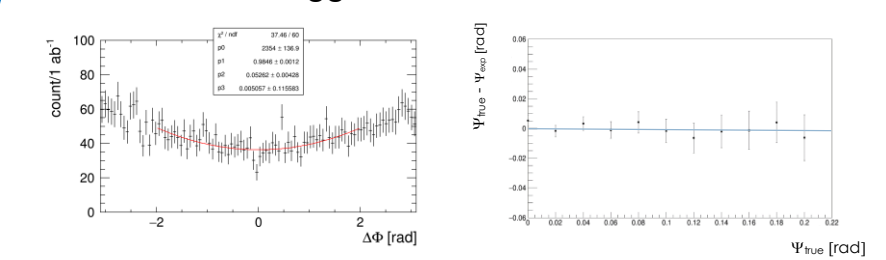
- Clear advantage of high-energy e^+e^- colliders;
- Unlimited by theoretical uncertainties unlike hh colliders;

Higgs exotic decays



- Precision below 0.1% in BR constrain [3] is also confirmed in full simulation in several individual measurements ($H \rightarrow inv.$, $H \rightarrow \phi\phi \rightarrow bb$);

CPV in the Higgs sector



- 125 GeV mass eigenstate of the SM-like Higgs boson could be a CPV mixture of scalar and pseudoscalar states;
- 1 TeV ILC is a favorable environment to measure CPV mixing angle in HZZ vertex (ZZ-fusion) with statistical dissipation not larger than 5 mrad for <10% mixture of the CP-odd state;

