

Discussion ideas

- What precision do we want for Triple Higgs? Quartic Higgs? More?
- Singlet coupling at loop level:

$$\delta\kappa_\lambda = \frac{1}{24\pi^2} \frac{\lambda_{HS}^3}{\lambda_{SM}} \frac{v^2}{m_s^2}$$



Platinum 1%

Sensitivity to typical quantum corrections to the Higgs self-coupling generated by loop diagrams

IF $\lambda_{HS} \sim \lambda_{SM}$ **AND** $m_s \gtrsim m_h/2$ $\delta\kappa_\lambda \lesssim .1\%$

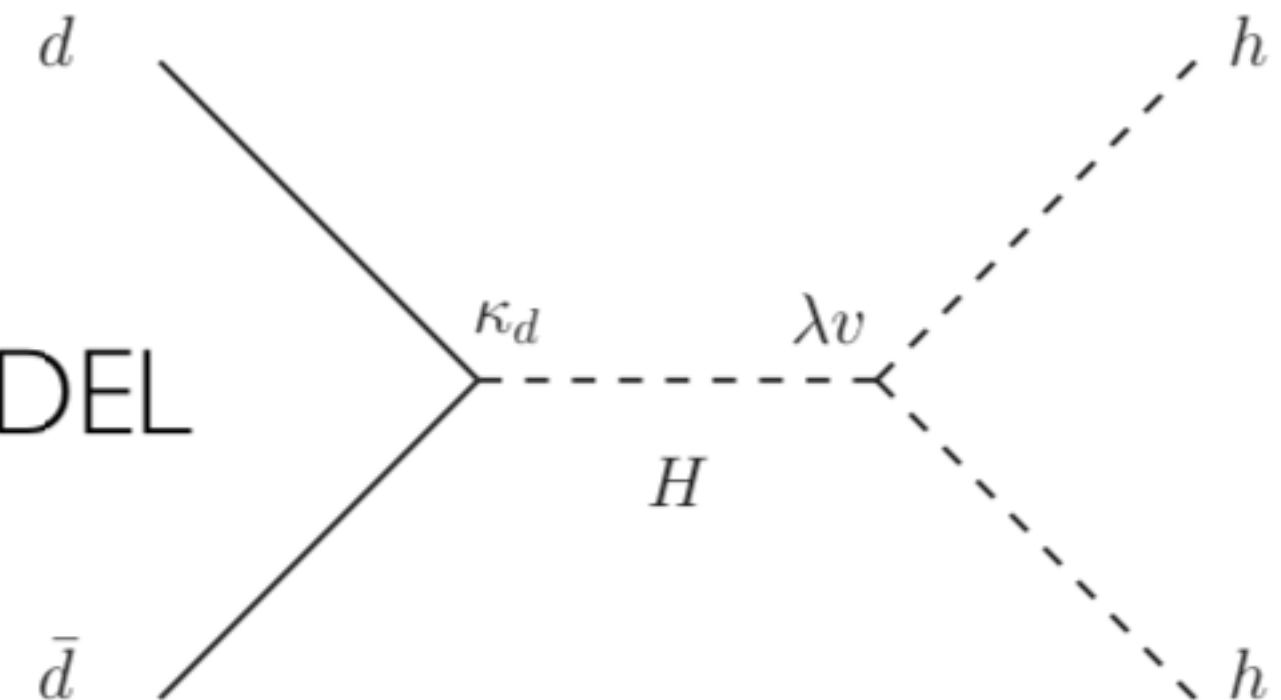
- Unitarity constraints by Spencer et al today as targets?

Discussion Ideas

- **When** is it only triple Higgs that matters?
- If we think about it just from the Higgs potential/EFT point of view what's our target?
 - EFTs already seem to completely fail based on naturalness, why should our power counting work for Higgs sector? Do we need to map out both dimension 6 and 8 or more?
- If there's a new state around, does resonance always win? What are the implications of big deviations? Flavor, EWP etc?

E.g. Sven today, and Daniel's Talk last week:

LARGEST DI-HIGGS XSEC OF ANY KNOWN MODEL



Physics motivations?

- Electroweak Phase Transition or lack thereof
- Naturalness
- Higgs Friends
- Dark Matter
- Stability of our vacuum

What experiment(s) do we need to achieve our goals?

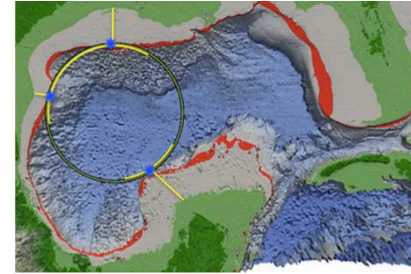


Figure 2: Bathymetry of the Gulf of Mexico, showing potential alignment of a 1,900 km circumference hadron

Collider in the Sea: Vision for a 500 TeV World Laboratory

Physics
Potential

FCC-hh

e-collider 25 TeV
 μ -collider 30 TeV
 μ -collider 14 TeV



CLIC

FCC-ee ILC

μ -collider 125



R&D attractiveness

