: Motivations for Energy Upgrade

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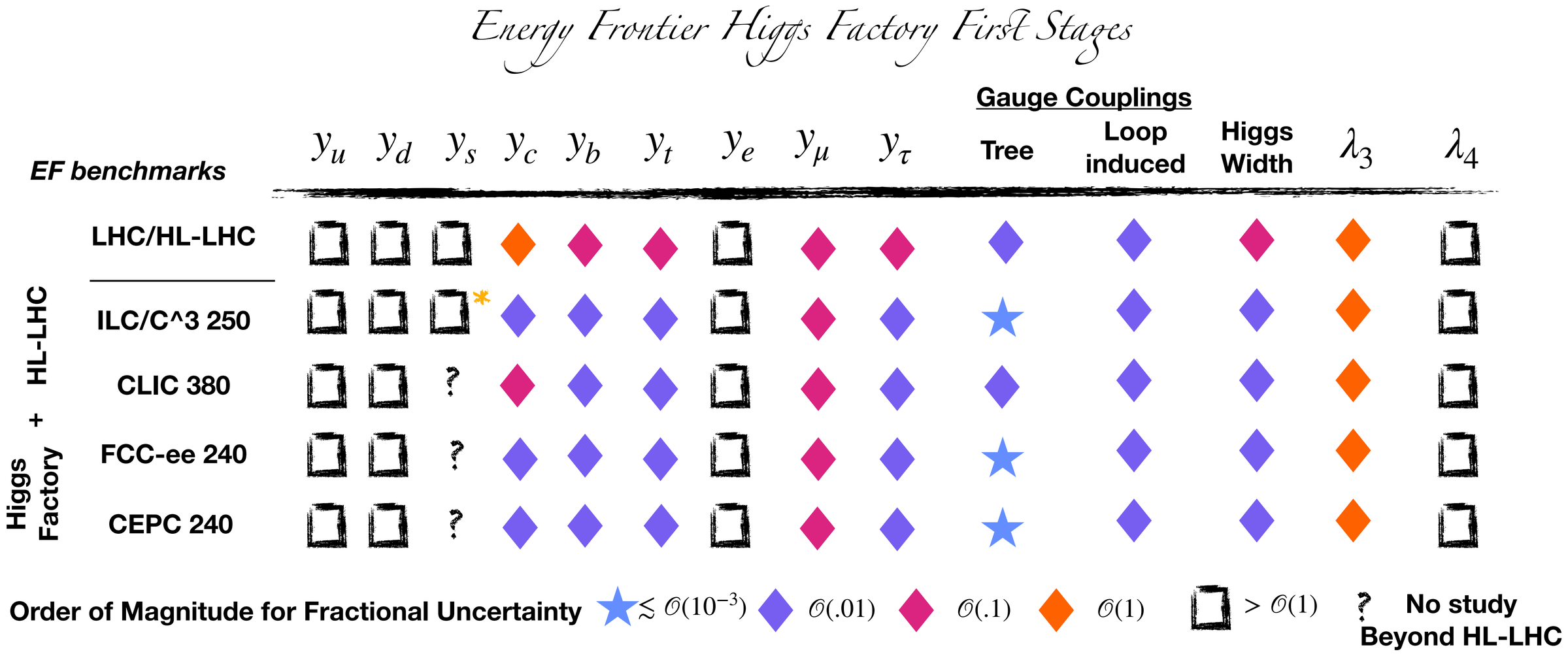
I was criticized that my last talk had too few memes so let's start strong…

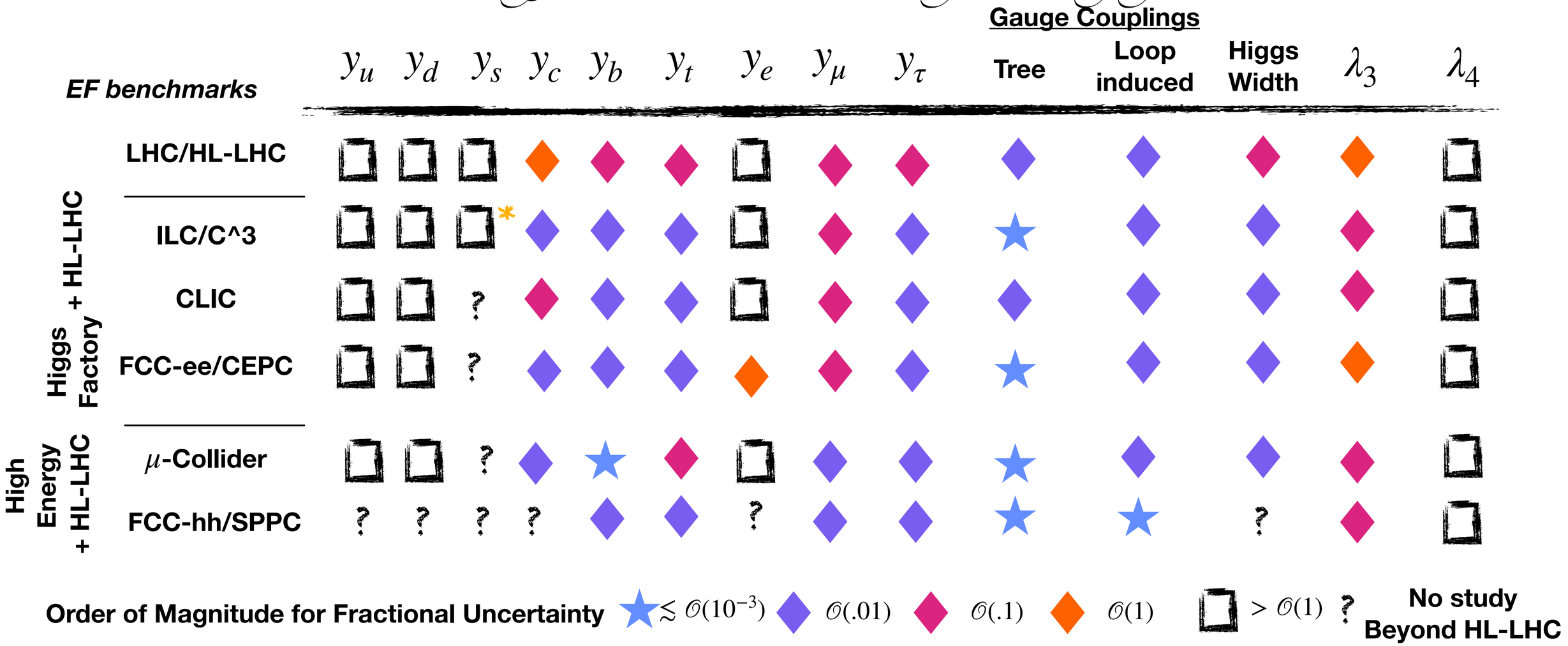
Okay so this is tongue in cheek, the field obviously benefits from **any** e^+e^- Higgs factory, but the point of a LC is the energy

First stage factories very similar



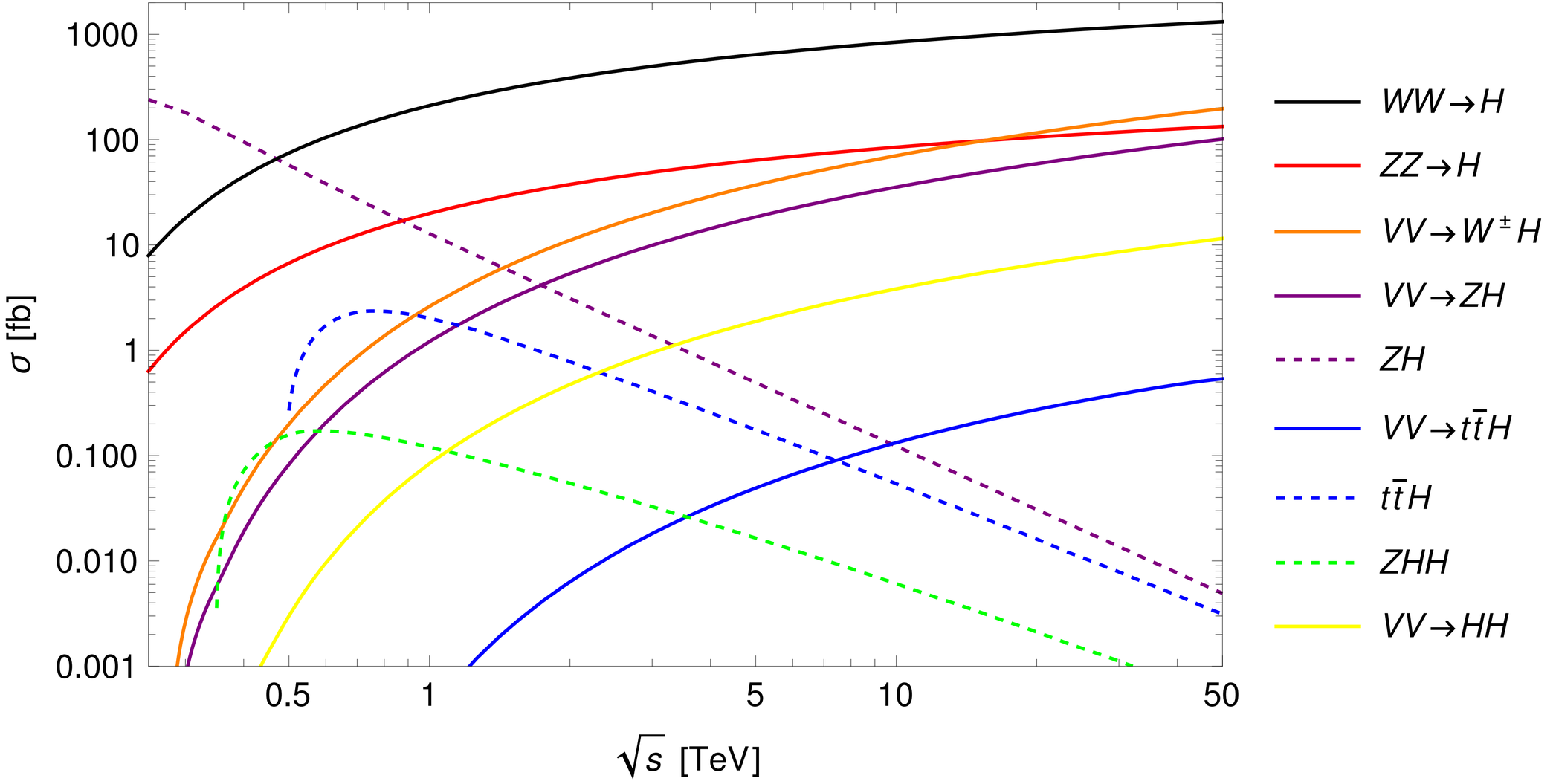
LC vs Circular in Higgs appears at later stages

Energy Frontier Benchmarks Integrated Staging

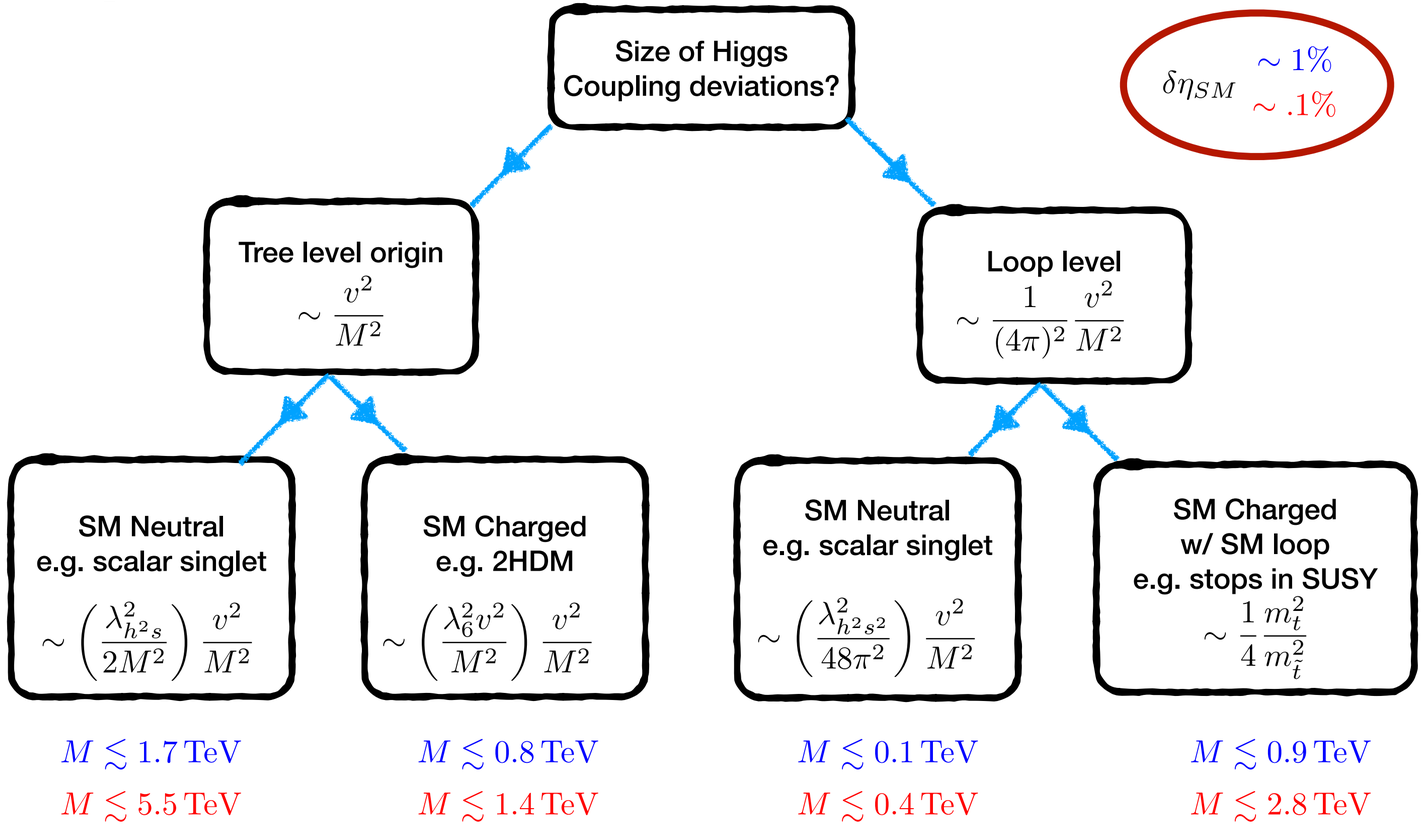


LC and Circular each have separate strengths!

New Higgs Insight with Energy



However there's another point that doesn't get emphasized as much at least IMO



Conservative Scaling for Upper Limit on Mass Scale Probed by Higgs Precision

- Many parameters are measured ~ 1% which means ~ 1 TeV scale for the origin of deviations - being able to get to 3 TeV means that you really have a good chance to test directly/indirectly

Precision good for new couplings

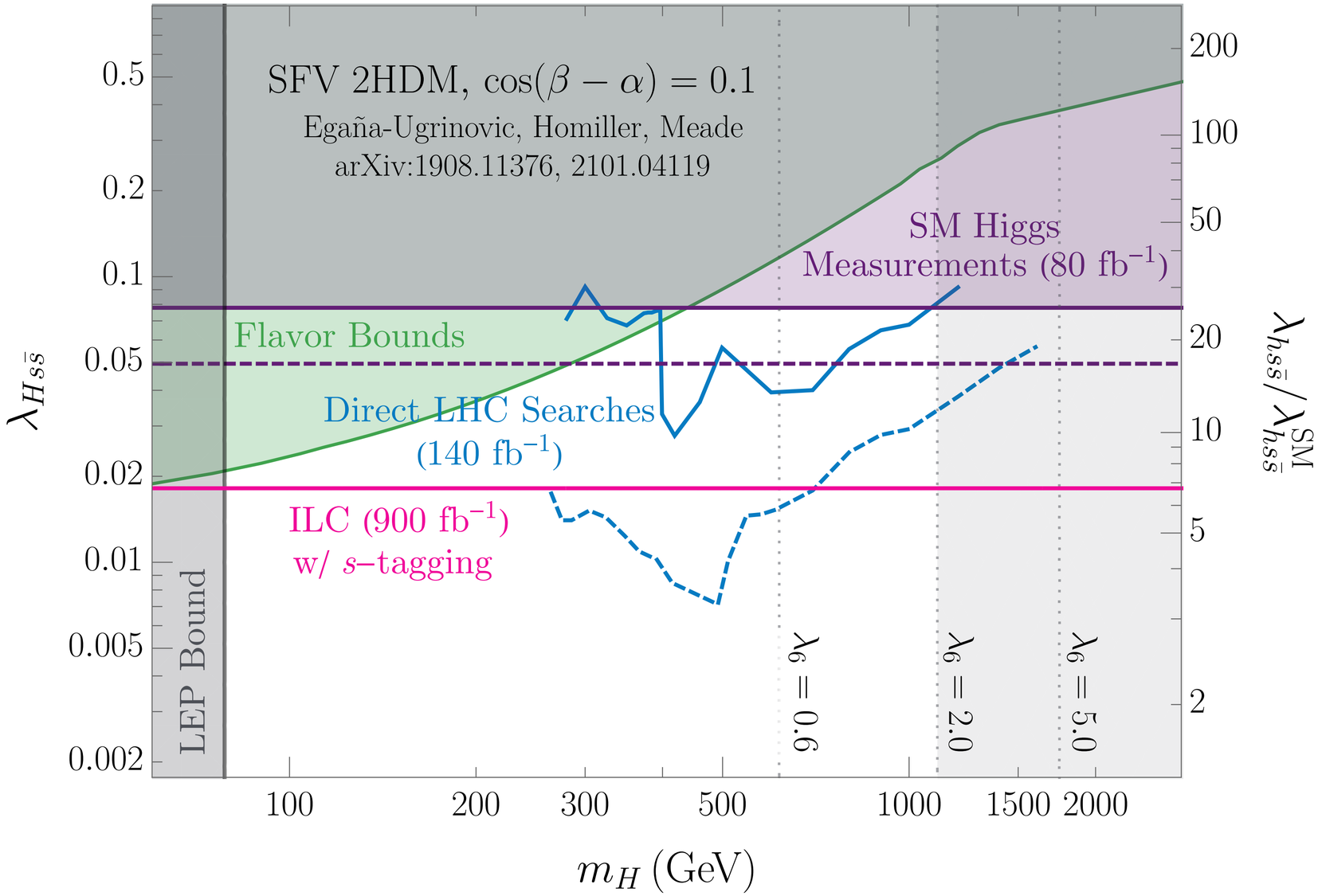
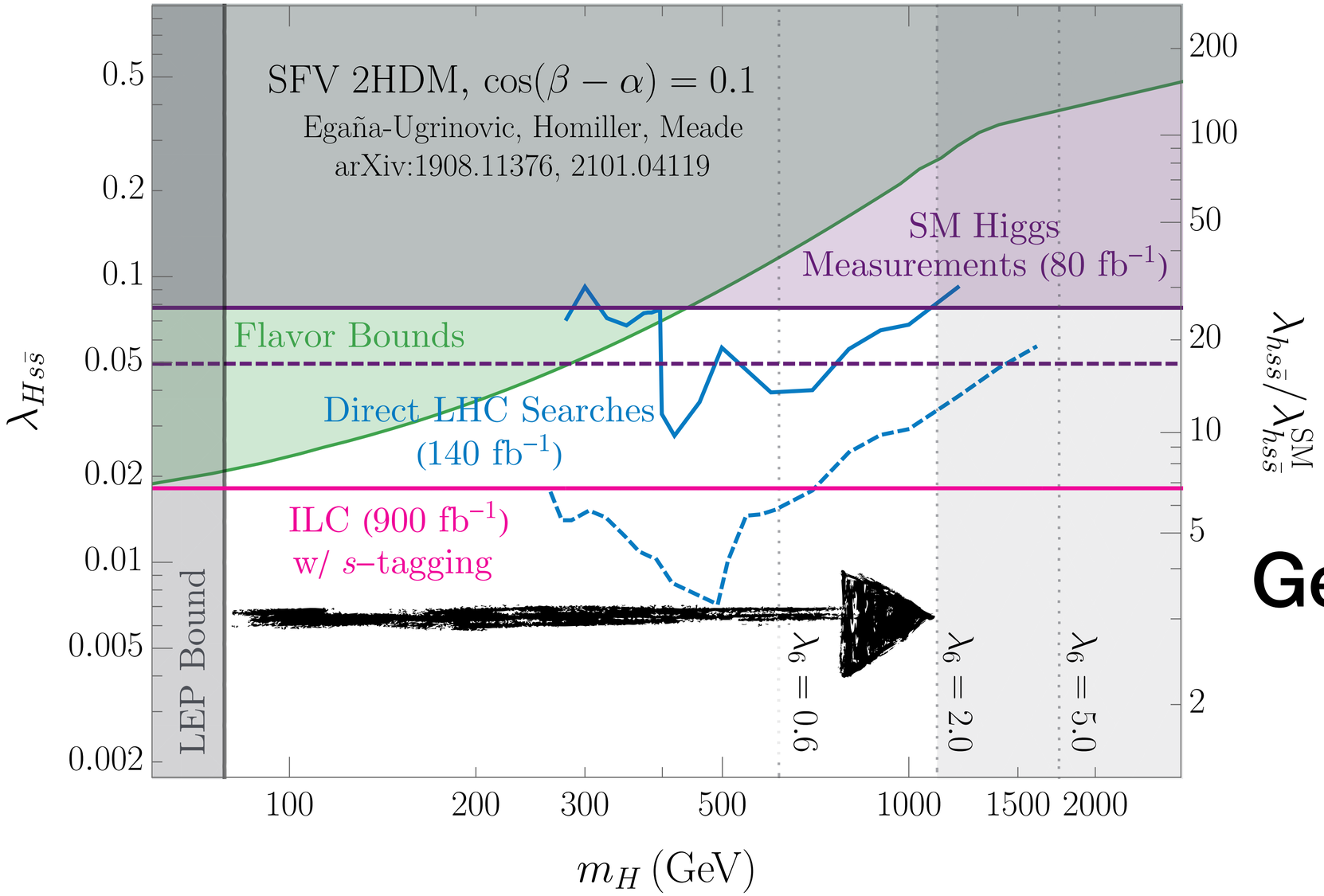


FIG. 35: Probes of flavor violation in a 2HDM at future colliders[64].

Energy wins fast!



General BSM lesson

FIG. 35: Probes of flavor violation in a 2HDM at future colliders[64].

BSM targets

- Dark Matter - Higgsinos and Winos are good simple WIMP candidates
  - If you get to 3 TeV you can cover Higgsinos
- Natural SUSY
  - Typically have sleptons/EWinos in 1- few TeV range, at 3 TeV you can start to probe this!
- Lots of other BSM ideas in TeV range, but in particular if you can get to 3 TeV you are beyond HL-LHC unequivocally unlike e.g. 1 TeV

Main points for Energy Upgrades for C^3

- Largest dual reach for e^+e^- in Higgs physics and the causes
- In particular 2HDMs even in alignment limit
- Ability to go after top, and top Yukawa
- Ability to improve Higgs self coupling beyond HL-LHC
- Ability to go for a difficult for DM detection simple WIMP candidate: Higgsino

A leptonic vision for the future