From UV-complete models to the SMEFT in multiboson processes

EFT in Multiboson 2024
COMETA Workshop

Padova, Italy
10 June 2024

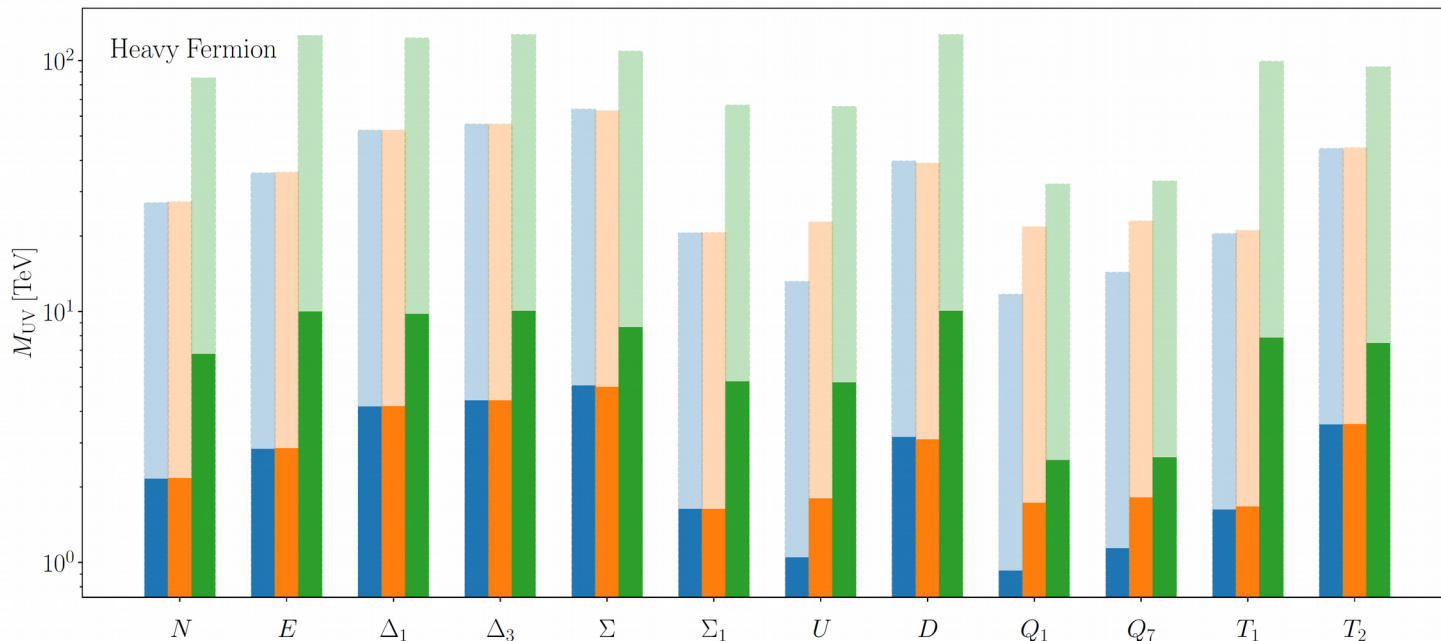Jose Miguel No (IFT Madrid)
Alejo N. Rossia (U. of Manchester)

The Automation of SMEFT-Assisted constraints on UV-complete models

- Imagine this but comparing with and without several multiboson channels and more models:

Are there "preferred" (*UV-motivated*) directions in EFT modifications to multi-boson processes?

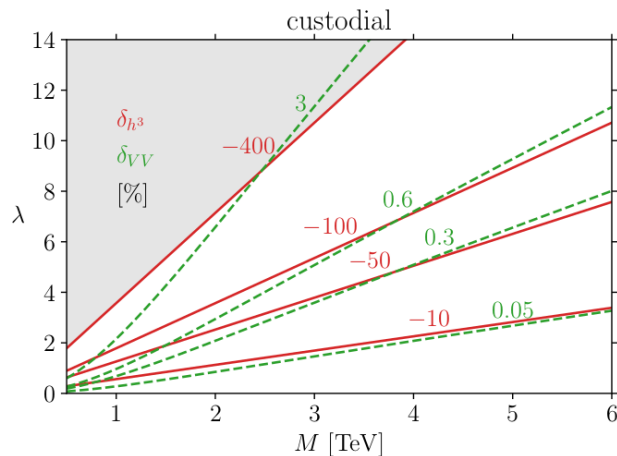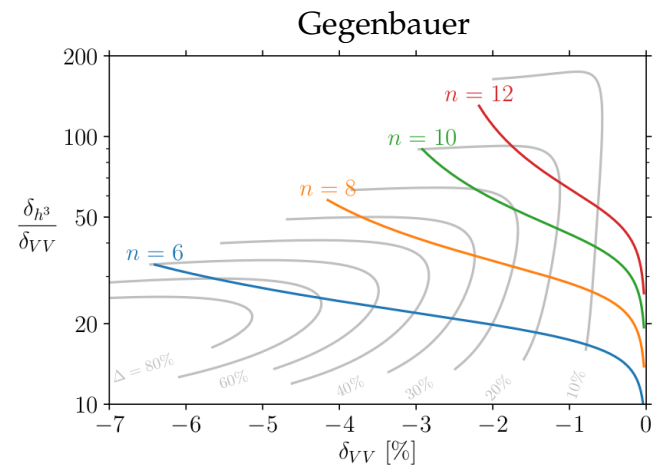(e.g. CHM, 2HDM suppress VVh coupling – without sign change –)

***hh* measurement will be landmark of HL-LHC.
What does it mean for UV models? Probe of new models?**

➤ ***hh* will be leading/only probe in few cases: (2209.00666)**

Durieux, McCullough, Salvioni, 2209.00666

➤ **Models for which *hh* will complement VV (@HL-LHC)?**

4.

Is SMEFT Enough?

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• 2HDM studies:

Cohen, Craig, Lu, Sutherland, 2008.08597

Dawson, Fontes, Quezada, Sanz-Cillero, 2305.007689

Arco, Domenech, Herrero, Morales, 2307.15693

Is SMEFT Enough?

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- Decoupling vs Non-Decoupling: "Loryons"

    Banta, Cohen, Craig, Lu, Sutherland, 2110.02967

    (Can multiboson finish-off the fermionic loryons?)

    How does it connect to other (recent) HEFT literature?

    e.g. Dawson, Fontes, Quezada, Sanz-Cillero, 2311.16897
        Anisha, Domenech, Englert, Herrero, Morales, 2405.05385
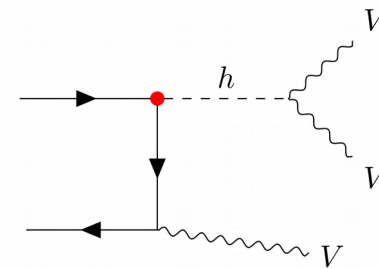   etc...

➢ **Triboson (+ *hh, off-shell h*!) sensitive to light-quark Higgs Yukawas**

Falkowski et al, 2011.09551

Alasfar, Corral, Grober, 1909.05279

Balzani, Grober, Vitti, 2304.09772

➢ **Global analysis with dim = 6 EW operators?**

➢ **Other (unforeseen?) opportunities from multiboson?**

6.