

# Is $M_p \sim 10^{19}$ GeV the (only) fundamental mass scale?

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☞ The discovery of Higgs at LHC sets a line between past and future: SM is complete ✈ What's ahead?

★ So far SM with 1 Higgs (and  $v$ 's updated) fits everything and is extremely successful!

✎ Fermions mass hierarchies;

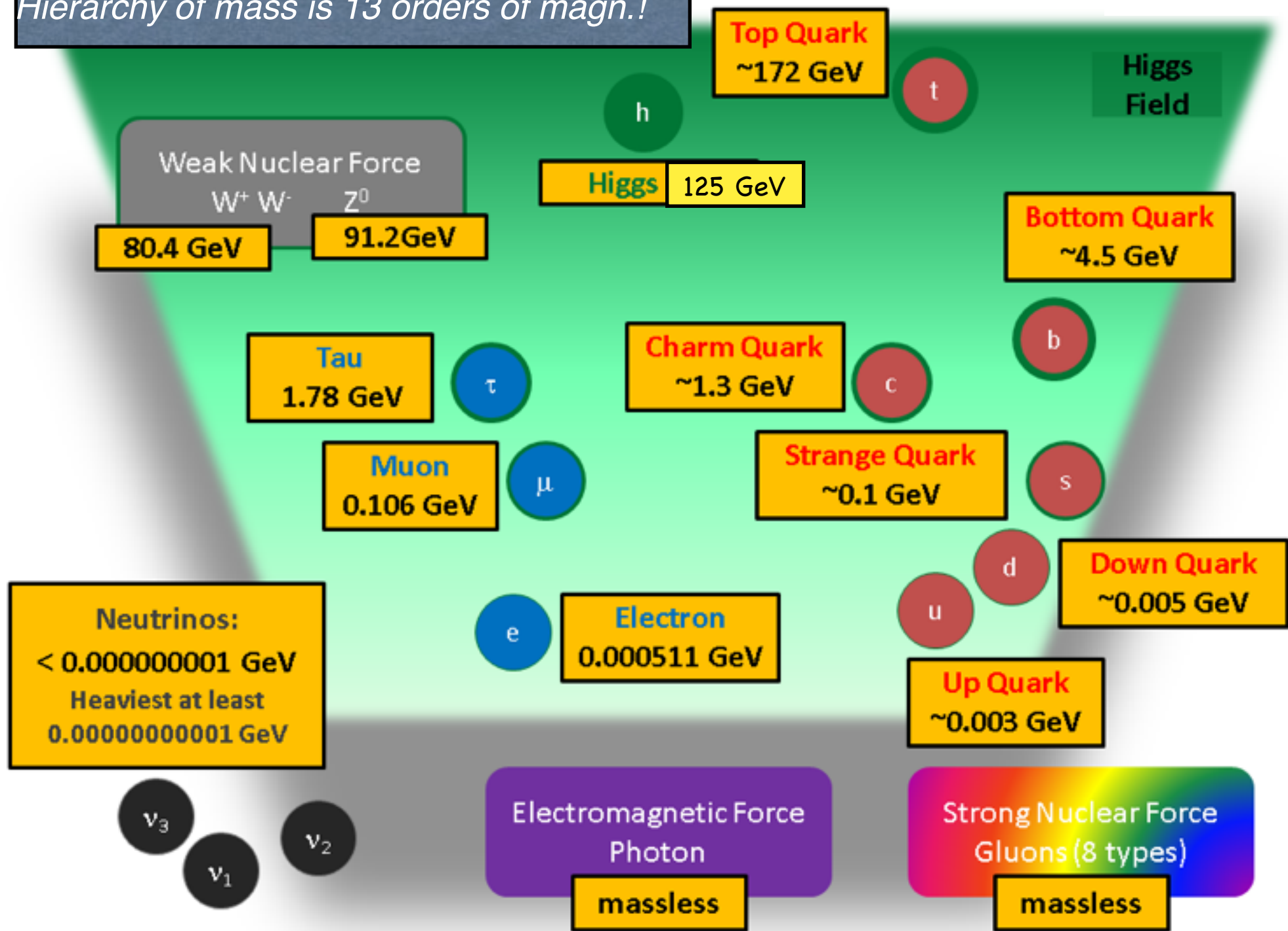
✎ Why all scales are so small in the units of  $M_p$ ?

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★ If we include cosmology, the worst hierarchy of all

$$*** \quad \Lambda_{\text{observed}} \approx 10^{-47} \text{ GeV}^4 \approx 10^{-122} M_p^4$$

Hierarchy of mass is 13 orders of magn.!



Axions???

# Options

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a) Naturalness is correct. (Almost) natural susy or some other solution at LHC-2015;

b) Physics at 1 TeV is unnatural  $\leftrightarrow$  Higgs and nothing else.

IF UNNATURAL:

Current ideas may have to be reexamined!

★ Landscape (anthropic) Multiverse laws are different in different places  $\rightarrow$  “physics” geographical?

★ The end of the Galileo Era of “matryoshka-doll” layer structure? (molecules $\rightarrow$ atoms $\rightarrow$ nuclei $\rightarrow$ nucleons $\rightarrow$ quarks....)