

SPLIT SUSY RADIATES FLAVOR*

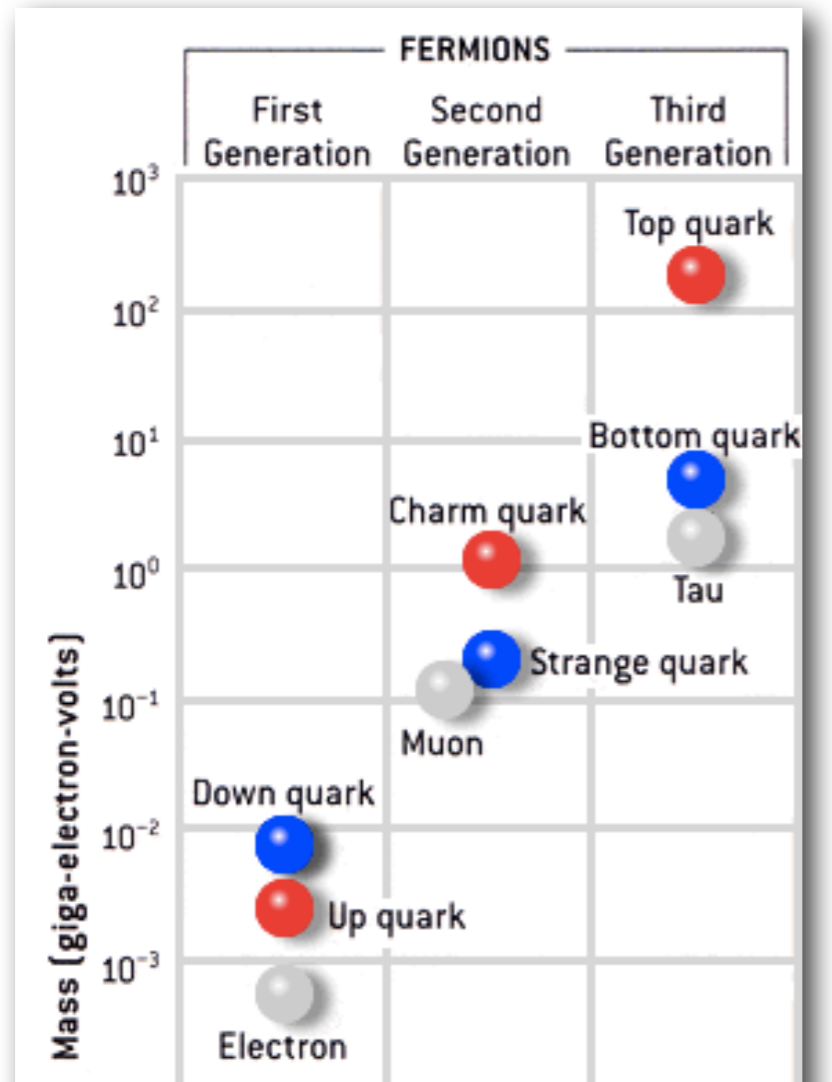


DANIEL STOLARSKI

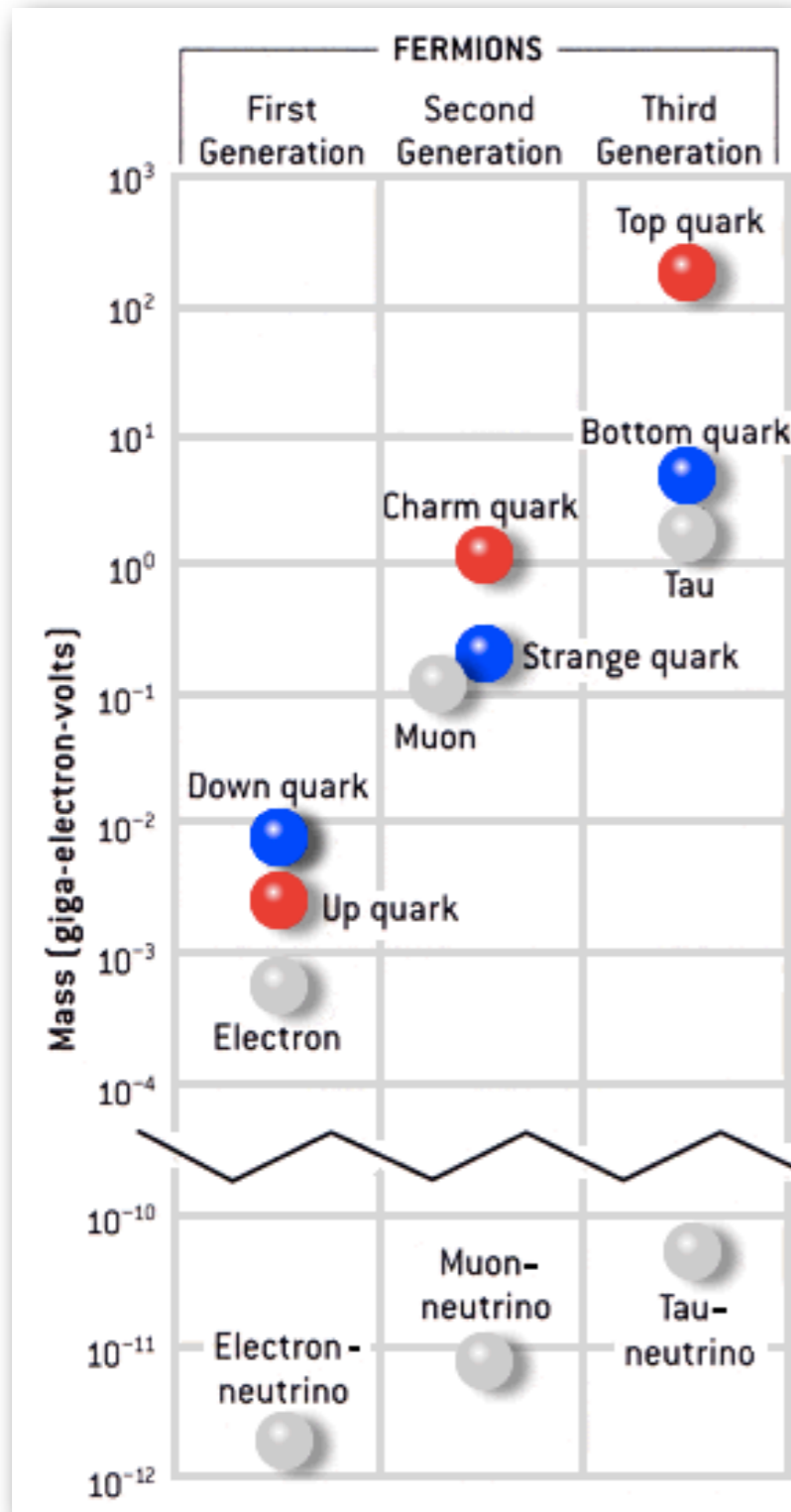
*Title is tentative

MATTHEW BAUMGART, DS, TOM ZORAWSKI, arXiv:1311.????

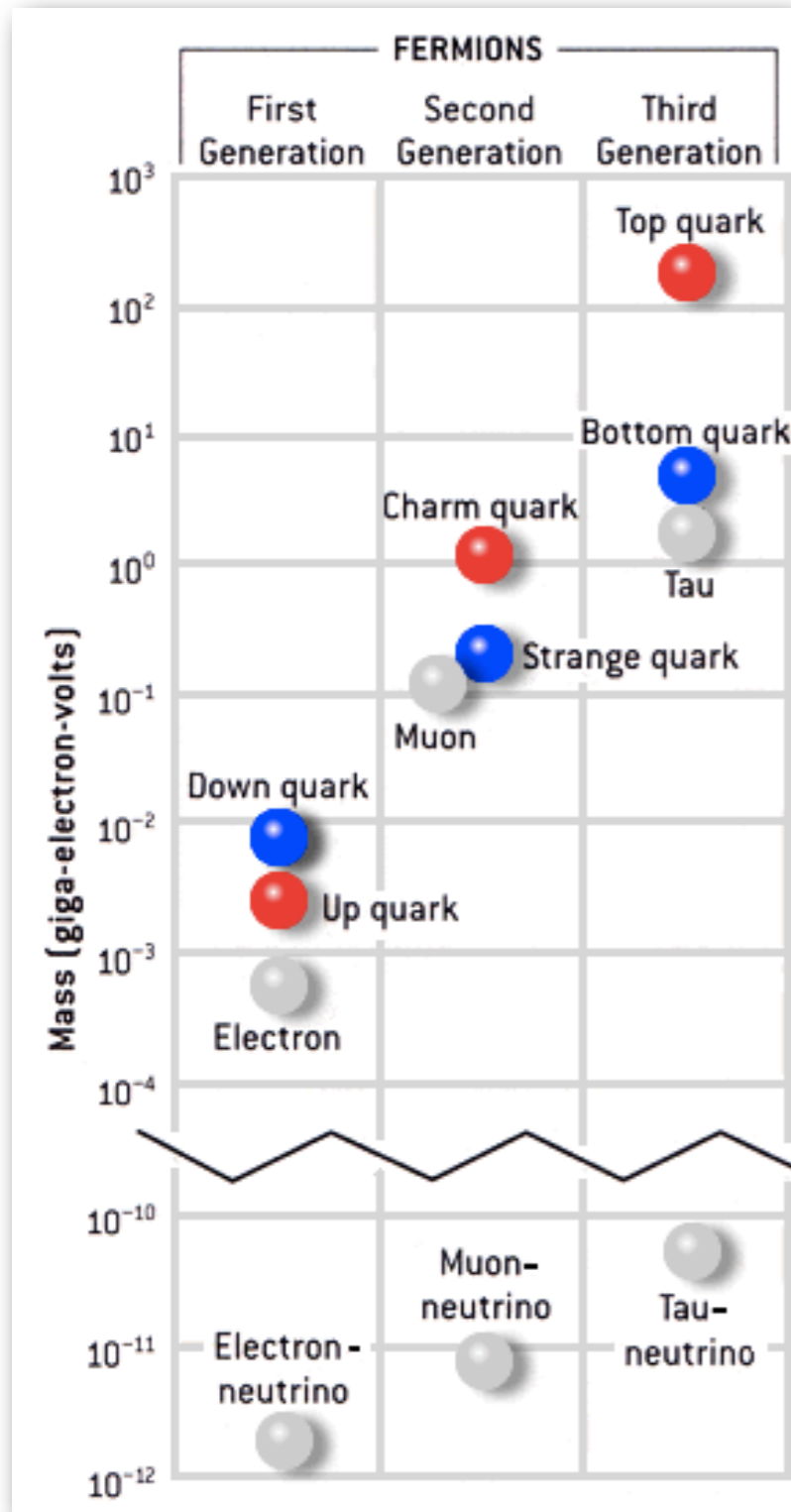
SM FLAVOR STRUCTURE



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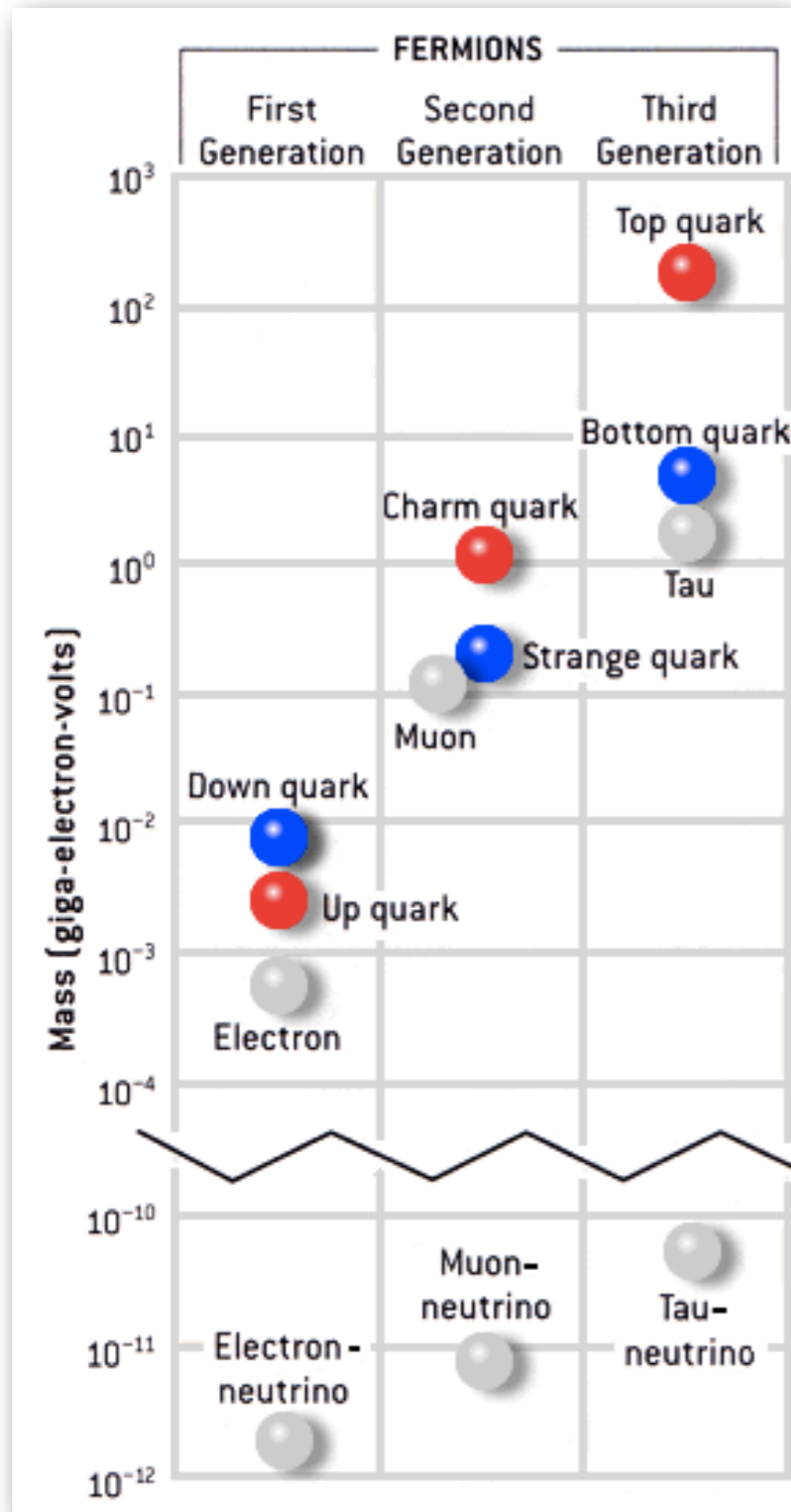
SM FLAVOR STRUCTURE



$$\frac{m_c}{m_t} \approx 0.007$$

$$\frac{m_u}{m_c} \approx 0.002$$

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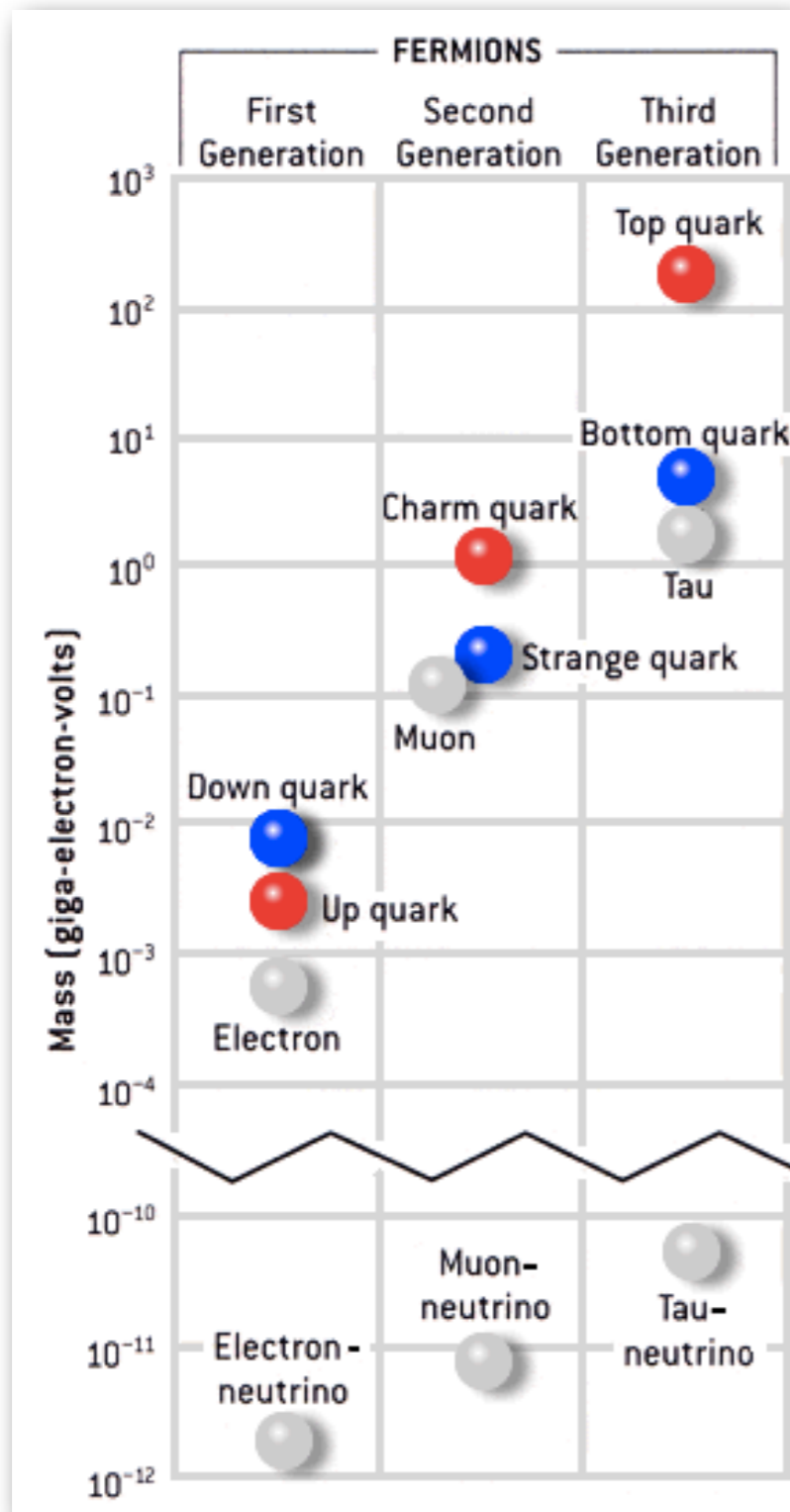


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Radiative flavor generation?

Top mass : tree level

Charm mass : 1-loop

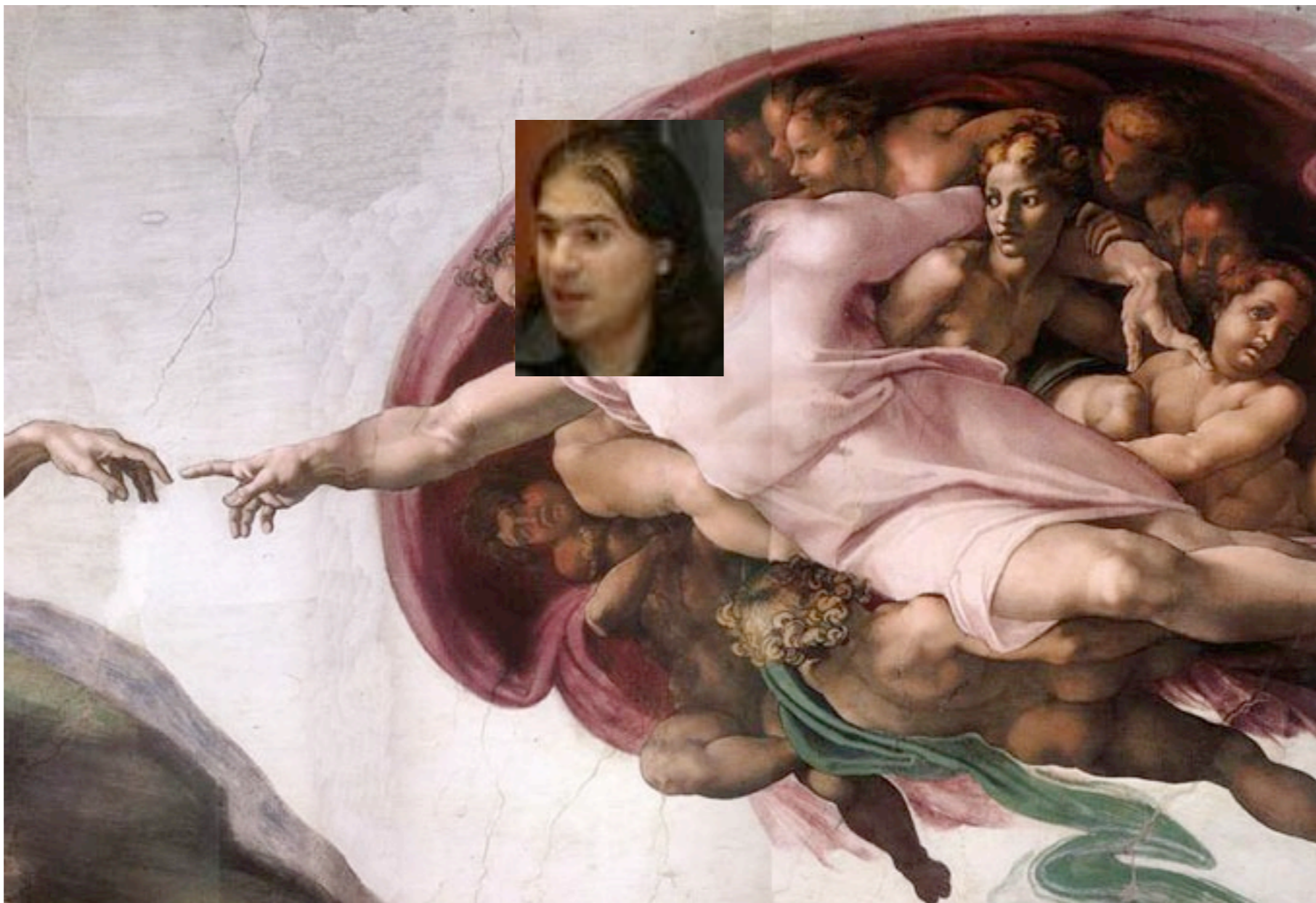
Up mass : 2-loop

NO NEW PHYSICS

LHC has seen no sign of superpartners and a Higgs a little too heavy for natural SUSY. What do we do?

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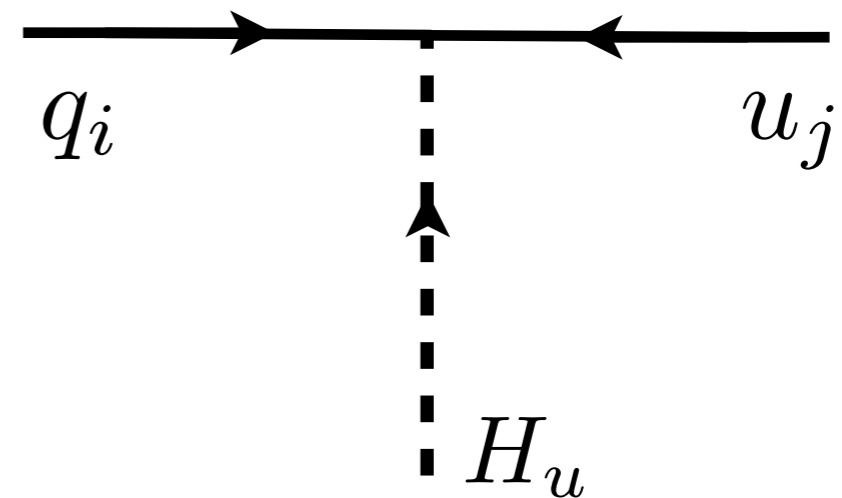
UNNATURAL (SPLIT) SUSY

What if all scalars are heavy (100-1000 TeV)?

- Get Higgs mass right
- Anomaly mediation gives gauginos 1 loop lighter
- Thermal wino has right DM abundance for mass ~ 3 TeV
- Solve SUSY flavor problem, can have large flavor mixing

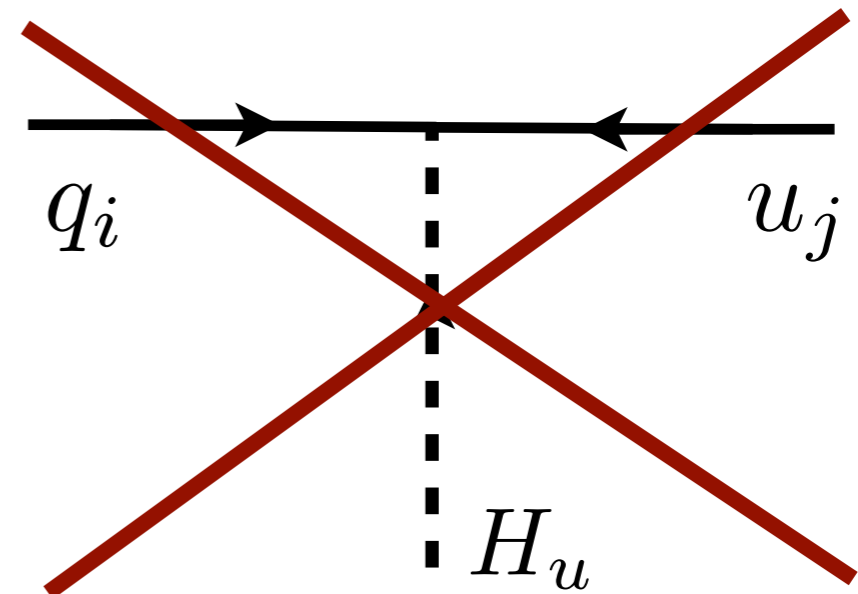
TREE LEVEL TOP MASS

1. Introduce U(1) symmetry which forbids SM Yukawa coupling
2. Add one vectorlike pair of fermions which couples to Higgs
3. Mix SM fields into new fermions via U(1) breaking



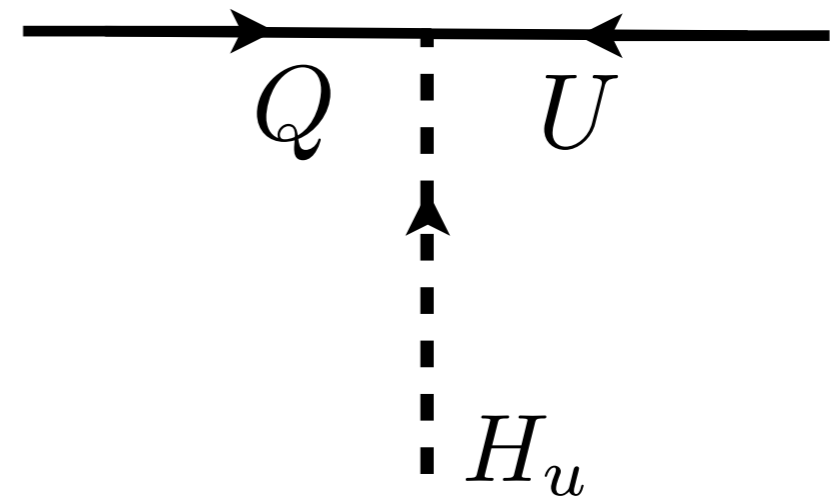
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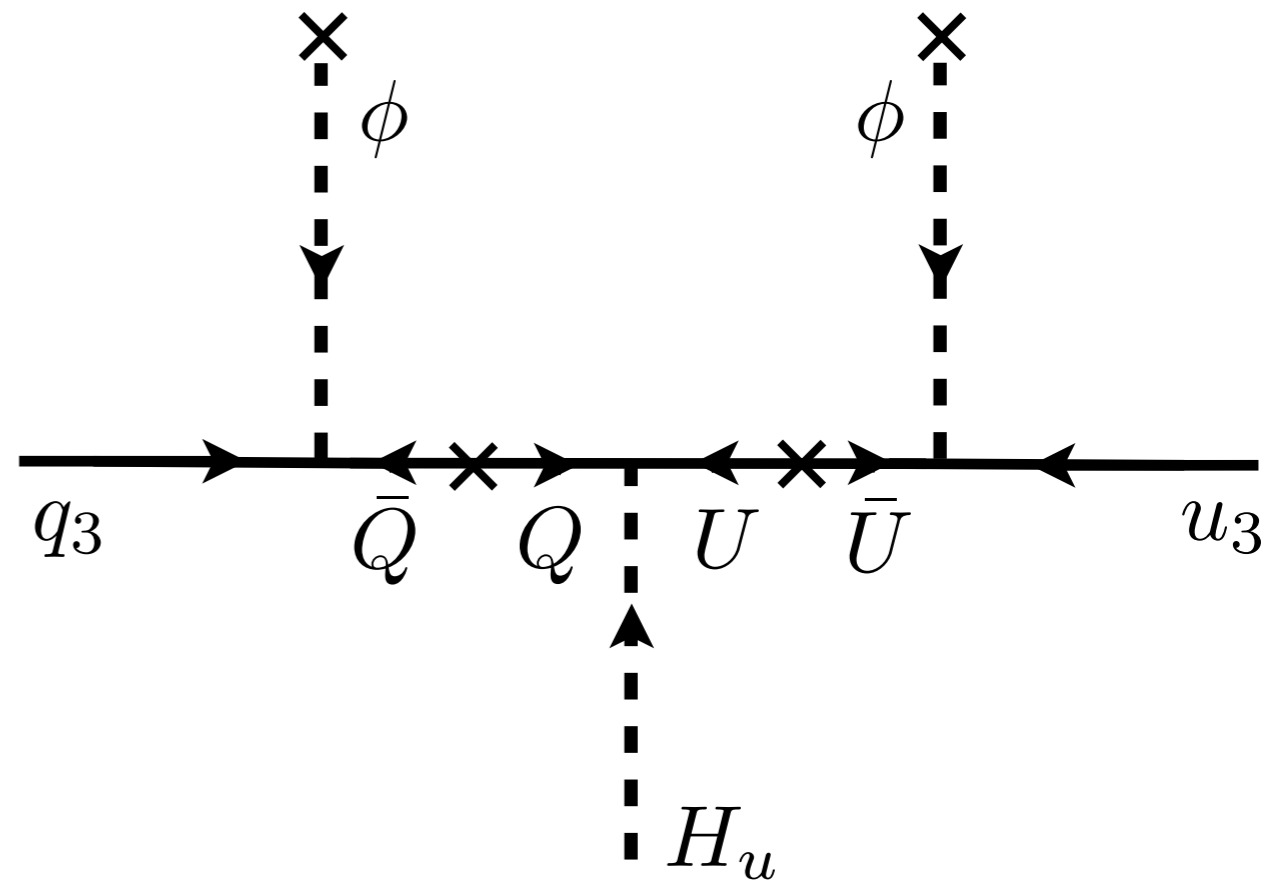
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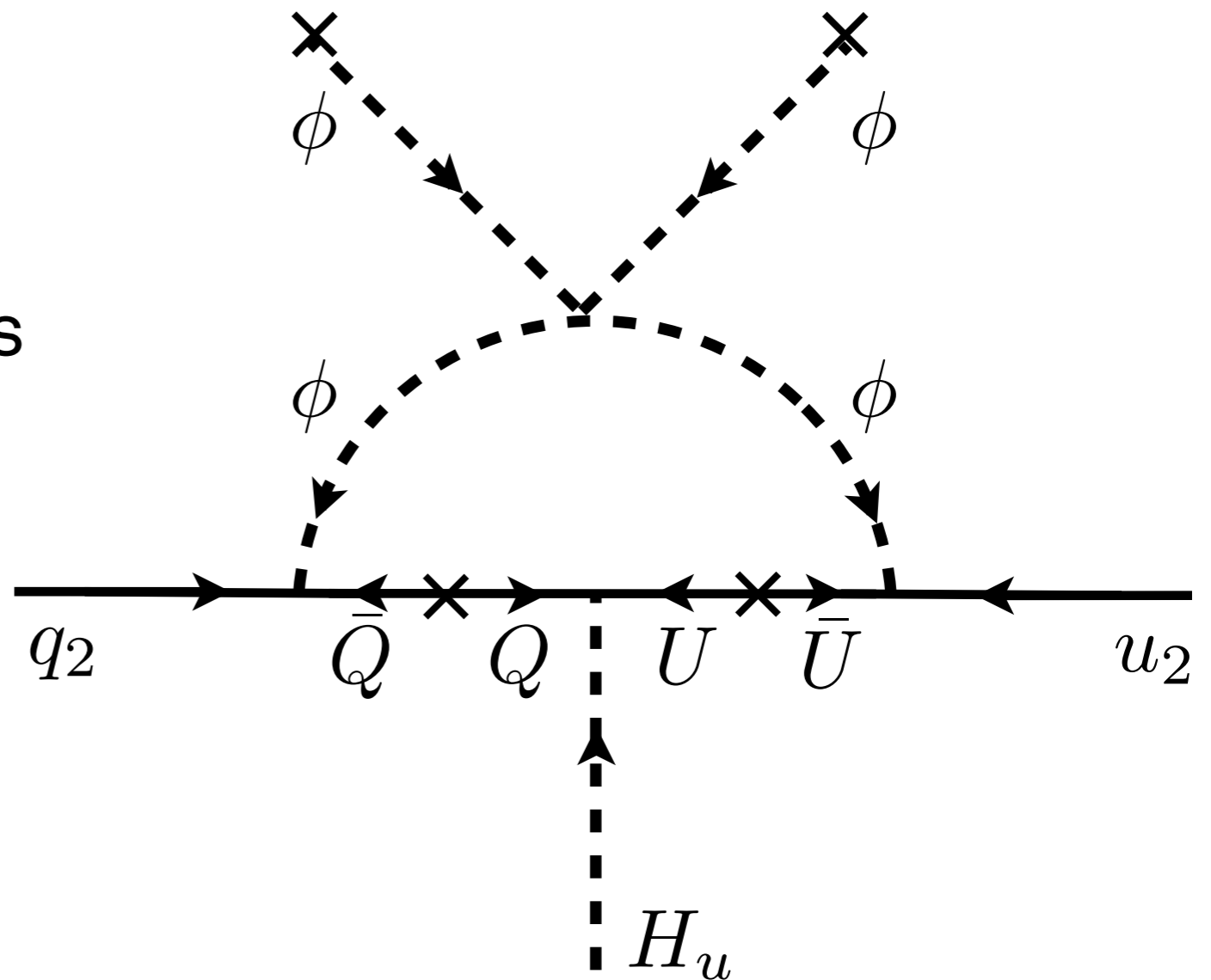
$q_i Q$ coupling is rank 1

Only top gets mass at tree level

ONE LOOP CHARM MASS

Make ϕ a doublet:

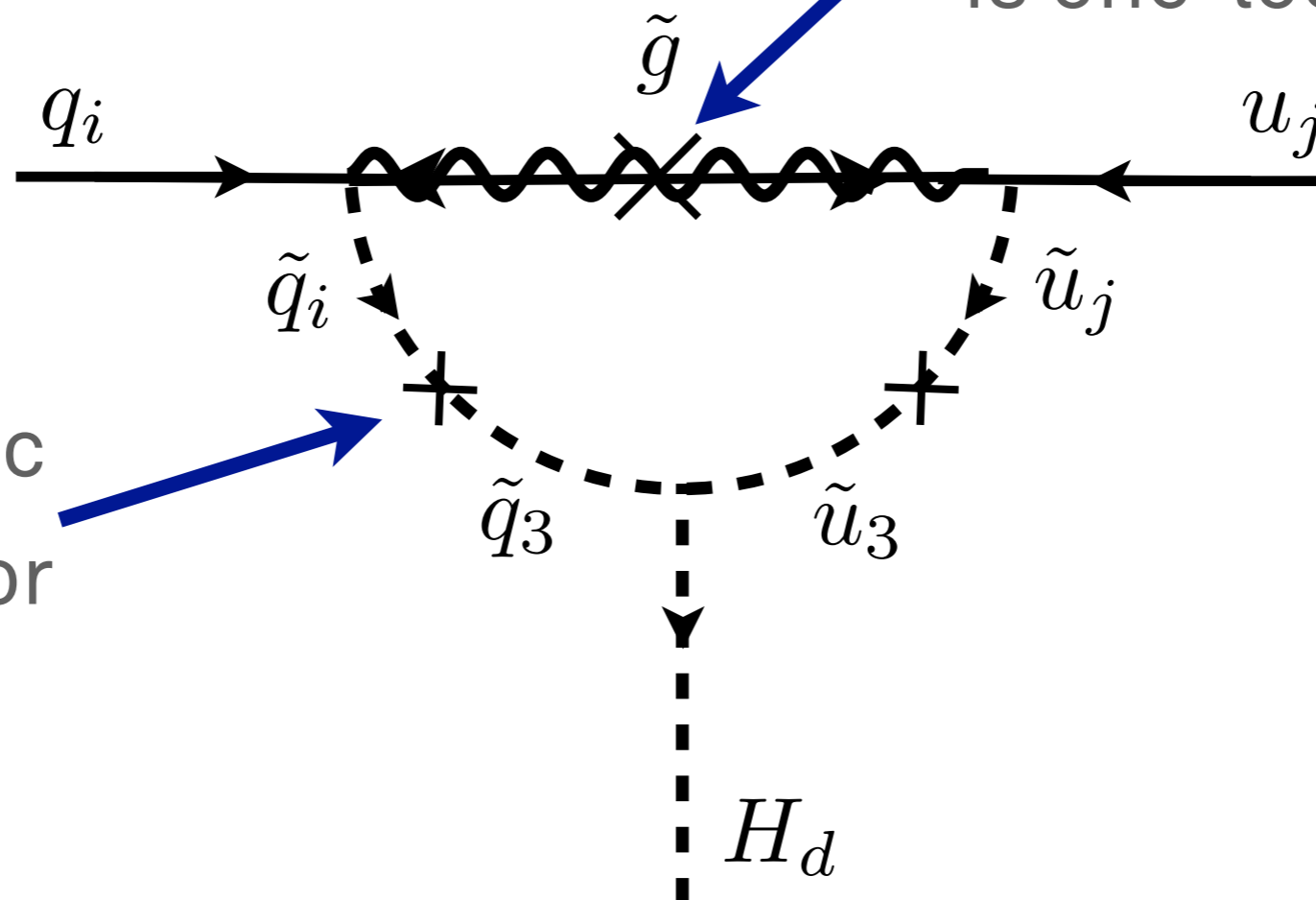
Top mass dynamics contains
one loop charm mass!



TWO LOOP UP MASS

Use squark mixing to seed two loop up mass

Gluino mass insertion
is one-loop



Use anarchic
squark flavor
structure

OTHER WORK

Current Projects

- CP violation in tth
- Radion couplings in RS
- Flavor mixing in natural SUSY

Recent Papers

- “Reach in all Hadronic Stop Decays” (Snowmass)
- “Dynamics of a Stabilized Radion and Duality”
- “Gauging the Way to MFV”
- “Directly Measuring the Tensor Structure of the Scalar Coupling to Gauge Bosons”