SHORT HW 8: **Higher order interactions**

Note that this short assignment is due in class on Thursday.

1   Higher order interactions

Here's a summary of the fields in the Standard Model. (One generation of particles.)

[**Flip**: Correction 3/1: Fixed hypercharge of $\bar{D}$, sign error. $Y_{\bar{D}} = +1/3$. Thanks Sergio.]

Write down three interactions that are gauge invariant (indices all contracted, net hypercharge zero) that we have *not* written in class. The net dimension of the fields should be greater than 4. For example, $|L^a \varepsilon_{ab} H^b|^2$ is a term with mass dimension 5.

Extra credit: once you get the hang of this, it's easy to make up arbitrarily crazy ones. Write down five more.

2   Reading

Read Prof. John Baez's article on **renormalizability**[1]. Explain why the higher order interactions in problem 1 are only 'effective' interactions and not fundamental.

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[1] http://math.ucr.edu/home/baez/renormalizability.html