https://github.com/mattbellis/tinkertoy-feynman

Tinker Feynman Diagrams

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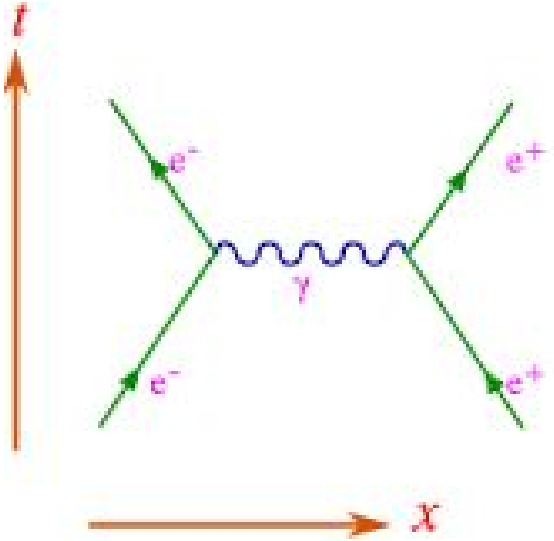
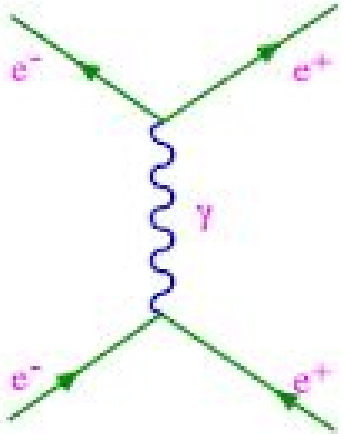
Science Hack Day San Francisco, 2017

SIENA

Feynman diagrams

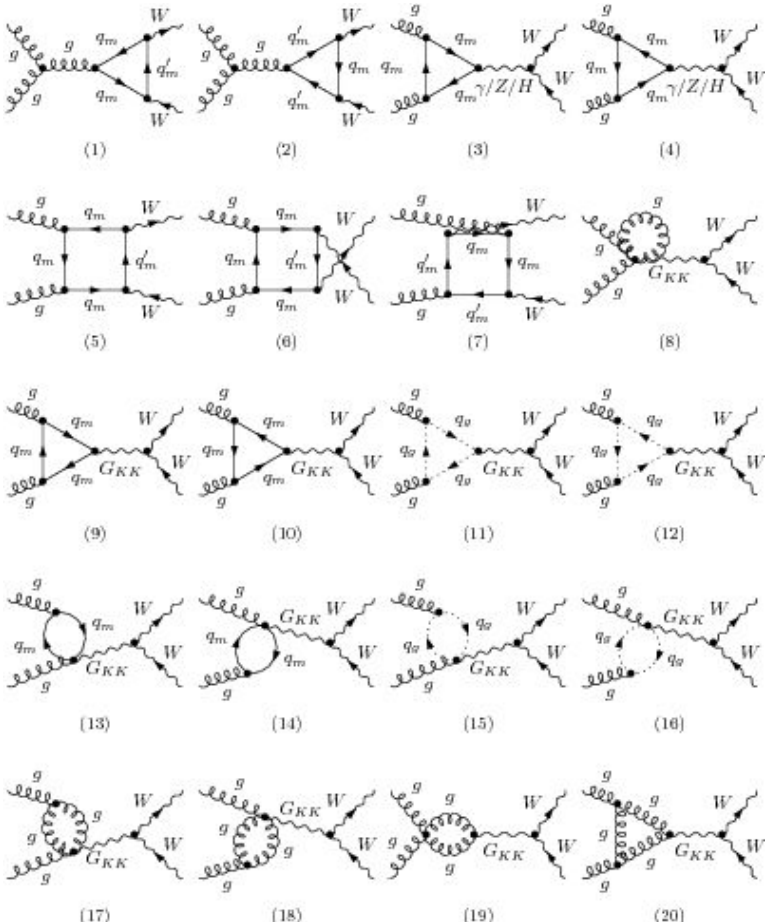
All these lines and vertices represent ***real mathematics***!



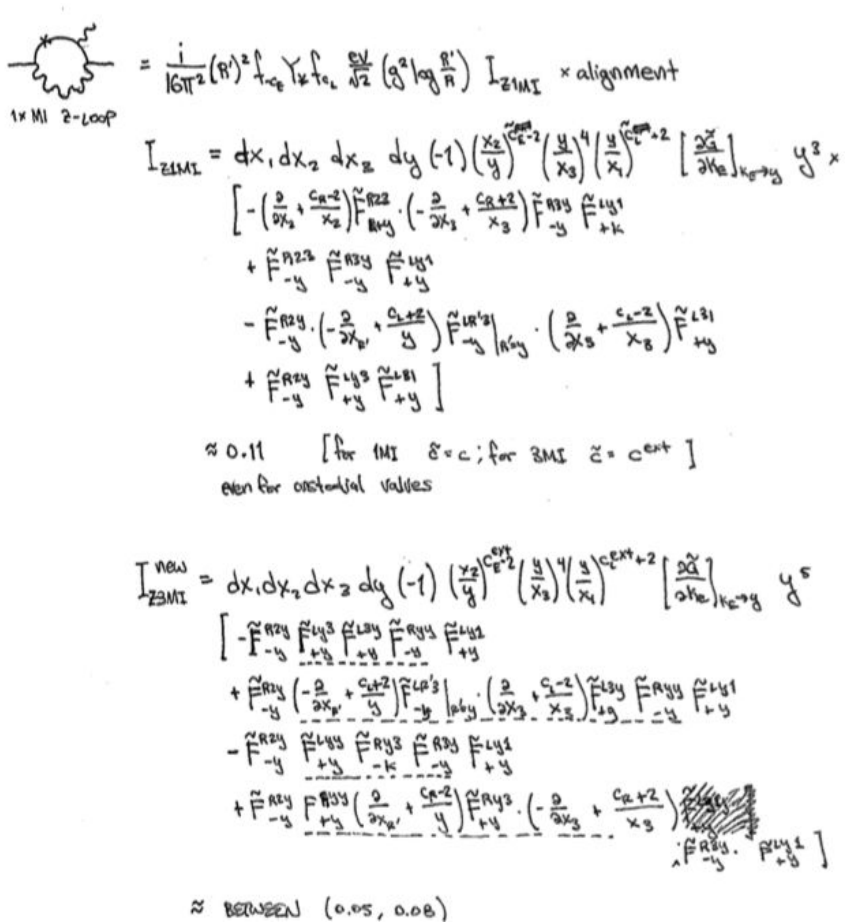


Theorists' tools to calculate probabilities of different subatomic particle interactions

Feynman diagrams

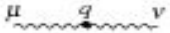


Can get pretty complicated!

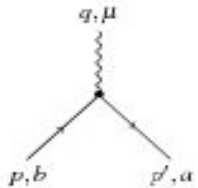


Feynman diagrams

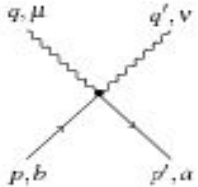
$$i(p^2 - m^2)\delta_2 \mathbb{1}_{ab} - im^2\delta_m \mathbb{1}_{ab}$$



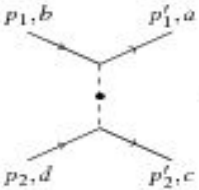
$$-i(g^{\mu\nu}q^2 - q^\mu q^\nu)\delta_1$$



$$-ie\left[V^\mu_{ab}(p,p')\delta_e + igM^{\mu\nu}_{ab}(p'-p)_\nu\delta_g\right]$$



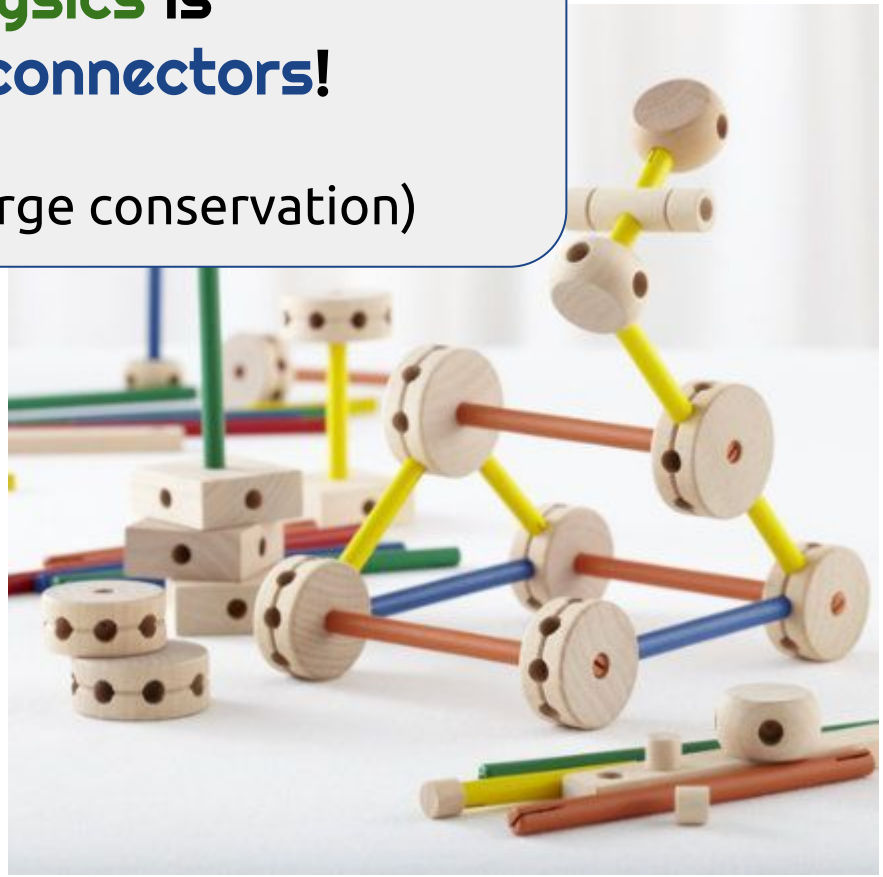
$$ie^2V^{\mu\nu}_{ab}\delta_3$$



$$i\left[\lambda_1\delta_{\lambda_1}\mathbb{1}_{ab}\mathbb{1}_{cd} + \lambda_2\delta_{\lambda_2}\gamma^5_{ab}\gamma^5_{cd} + \lambda_3\delta_{\lambda_3}M^{\mu\nu}_{ab}M_{\mu\nu cd}\right]$$

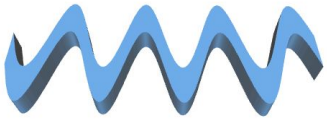
The physics is in the connectors!

(e.g. charge conservation)

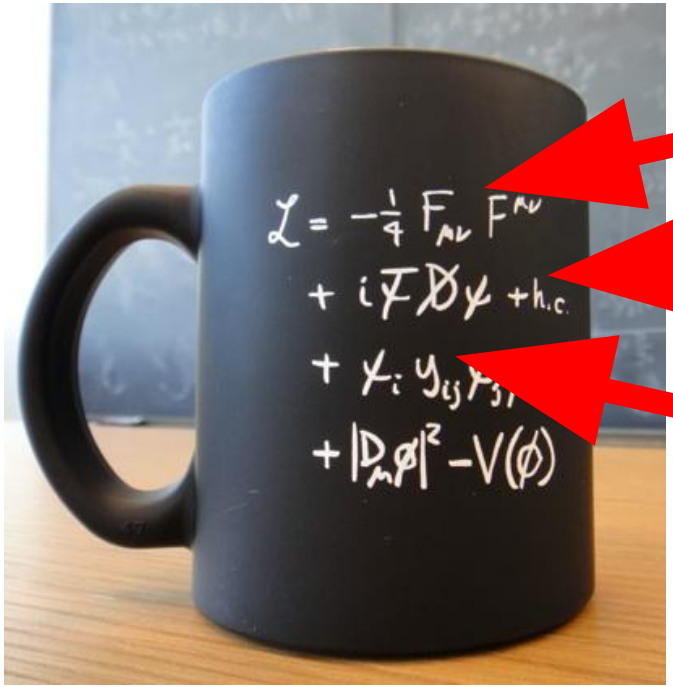


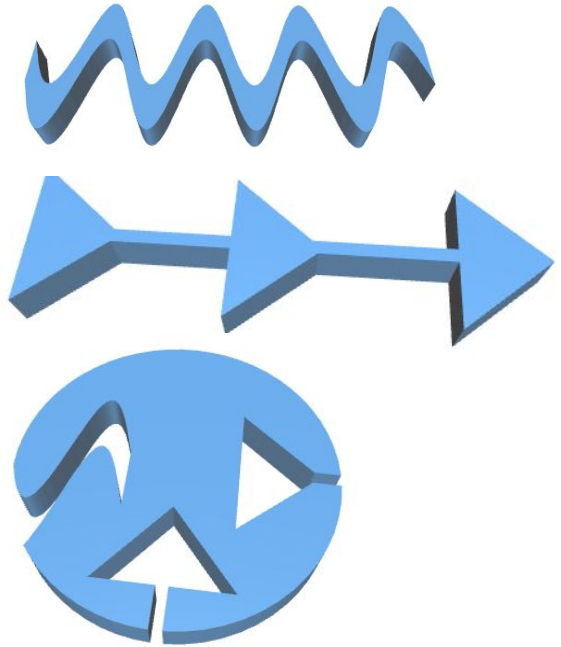
Implementation: Connector Pucks

Maddy



This *really* encodes the mathematics





Potential for **education** and **outreach**
… for children and PhD students

Technical Challenge

Looking forward to printing these when we get home!

Sorry, not this weekend. Lulz.