

- **Detailed characterisation** of Higgs

top priority of second LHC run and future colliders

→ include “*anomalous couplings*” in calculations for Higgs production and decay

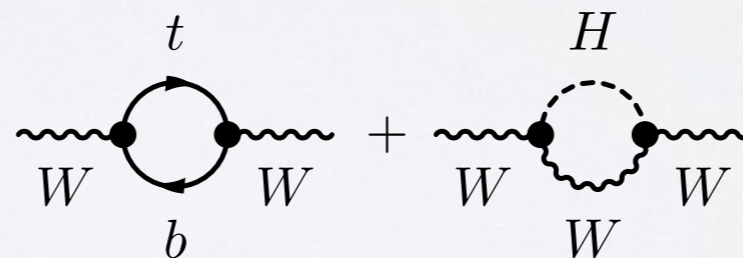
- **Direct search** for new Physics (e.g. SUSY)

Search for superpartners at LHC

→ improve predictions for *production of superpartners*

- **Indirect evidence** for new Physics

through quantum corrections on precision observables



→ *precise predictions for top-quark and W/Z-boson production*

- **Methods** in Quantum Field Theory:

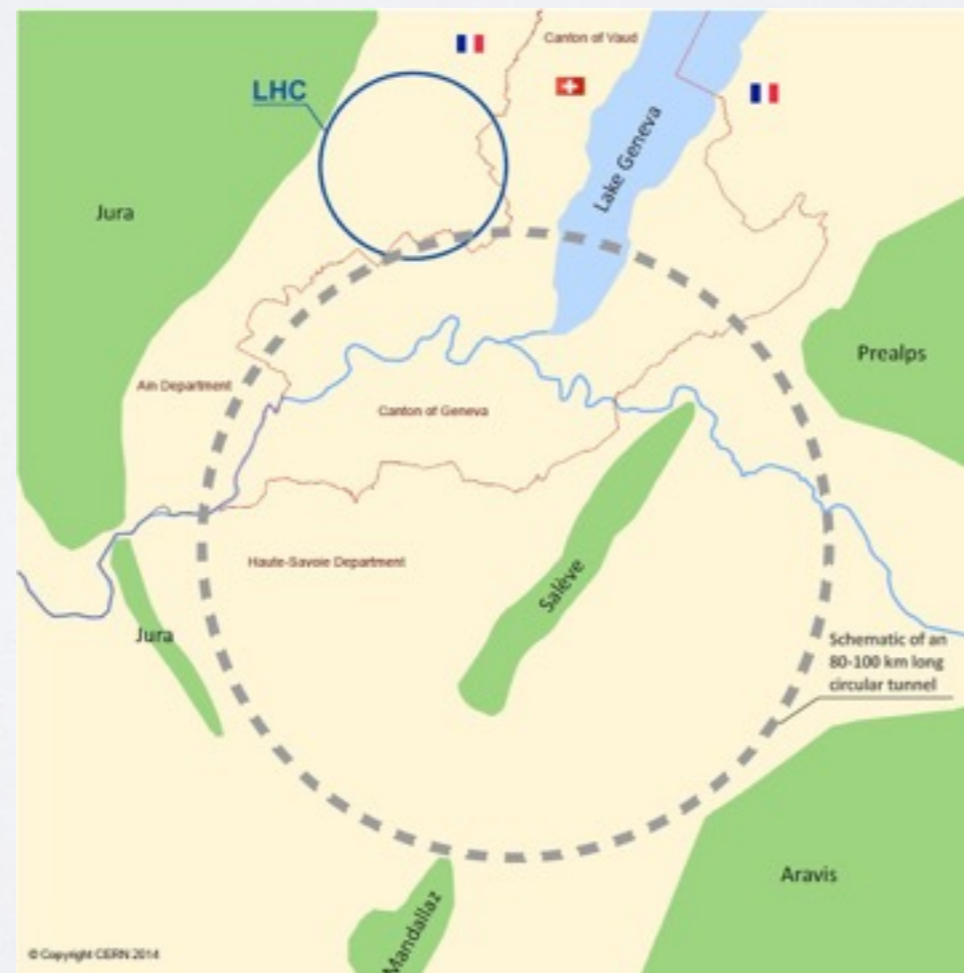
- Alternatives to Feynman diagrams
- Effective field theory

GROUP OF P.D. CHRISTIAN SCHWINN

Bachelor Thesis:

Exploring top-quark production at hadron colliders

- Top quark mass important input for precision tests
- Top-pair production cross section depends on top mass, strong coupling, PDFs
- Precise measurements at Tevatron and LHC
- Future projects: high-luminosity LHC, HE-LHC (27 TeV), FCC (100 TeV)



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Thesis project:

- Implement convolution of partonic cross section and parton distribution functions
- Use existing programs for up-to-date theory predictions
- Investigate sensitivity to top mass, strong coupling and PDFs at LHC and future colliders

