Restoration of electroweak symmetry in single-gauge boson production at the LHC

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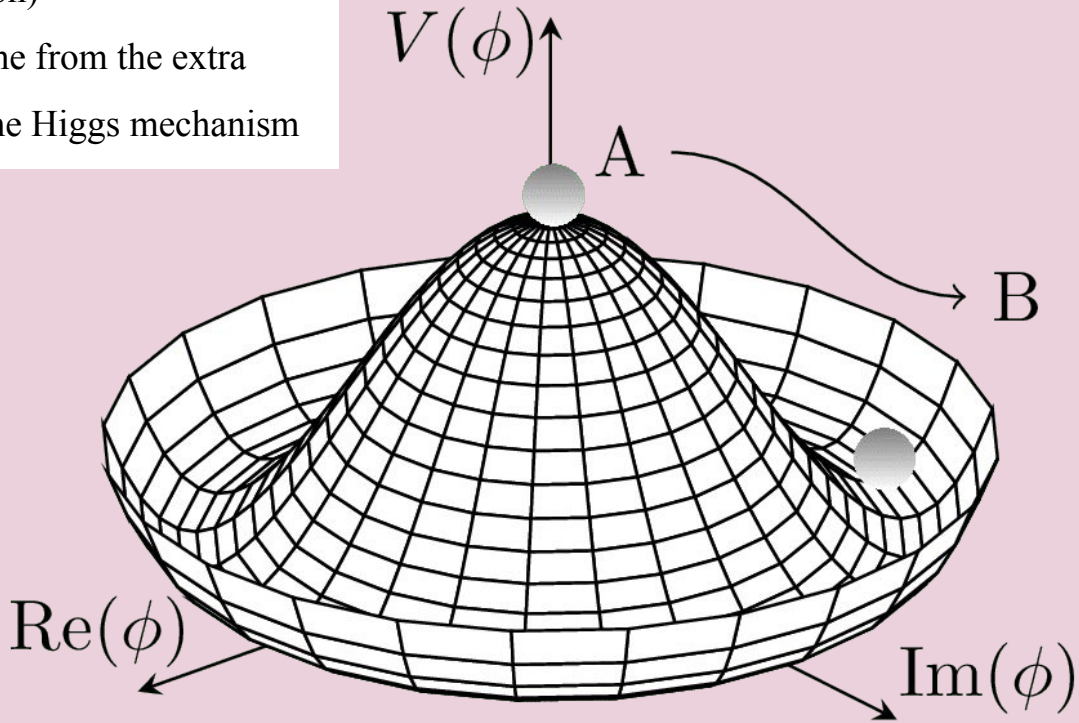
Background

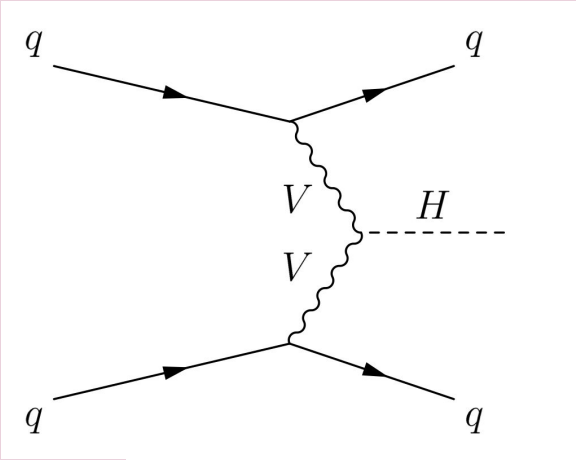
- W and Z bosons get their mass from the Higgs mechanism
- Because they have mass, they can be longitudinally polarized (spin is perpendicular to direction of motion)
    - Longitudinal polarization states come from the extra degrees of freedom introduced by the Higgs mechanism

- Studying longitudinally polarized bosons can help us understand more about boson interactions and Higgs mechanism
    - It could also point to BSM physics



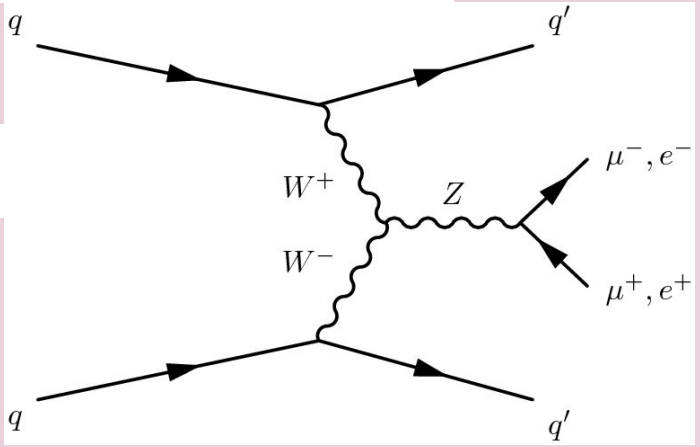
My project

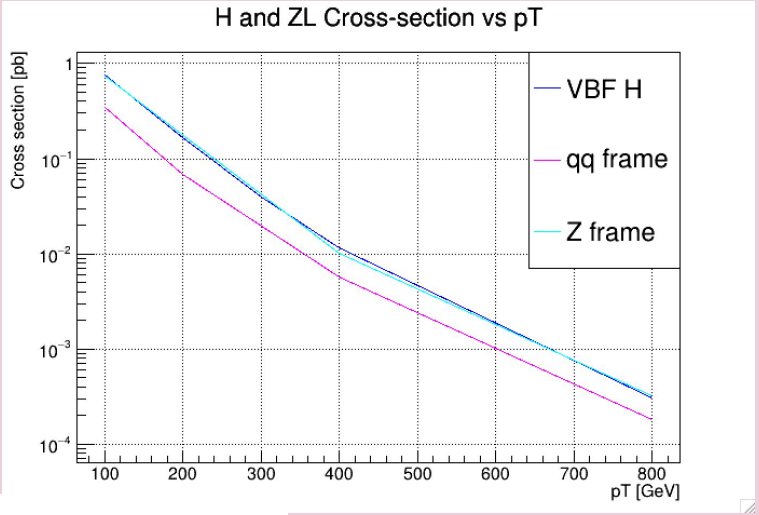
- Sensitivity study for a measurement at the LHC
  - Focusing on the energy dependance of cross-section which, in theory, should converge to the cross section of the Higgs (Nambu and Goldstone)
- Study kinematic variables to discriminate against transverse polarization states



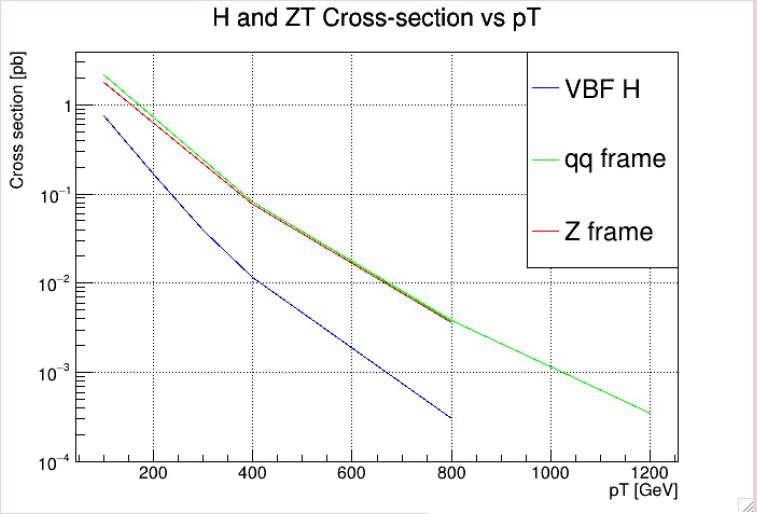
VBF H

VBF Z

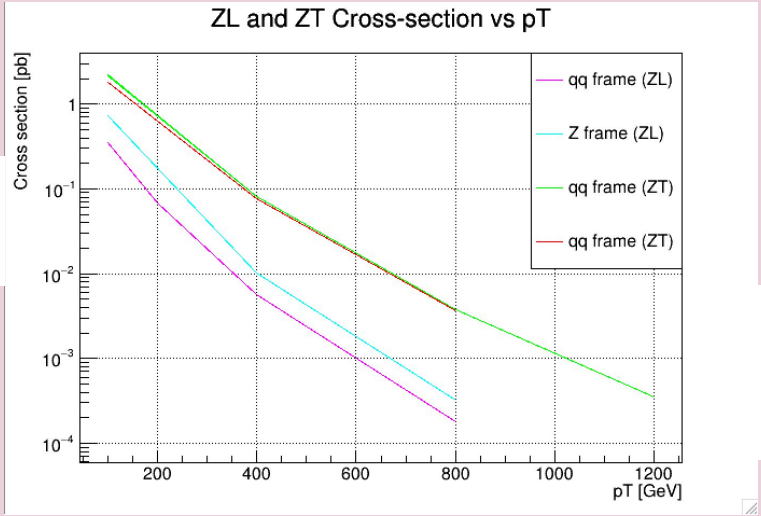




ZL in Z frame converges with VBF H



ZT does not converge with H (as expected)



ZL production is less than ZT production

But not so much less that it would be impossible to measure