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Homework Assignment IV

Problem 1: Draw the diagrams corresponding to Higgs production channels at the Tevatron, LHC and a future e^+e^- linear collider. Comment on the strength and potential for discovery of each channel.

Problem 2: The Standard Model predicts that the Higgs has tri-linear and quadric-linear self-couplings. Indicate the part of the interaction-Lagrangian that those couplings come from, draw the relevant Feynman diagrams, and calculate their strength.

Problem 3: It has been proposed to measure the tri-linear Higgs self-couplings in a future e^+e^- linear collider via the process:
$e^+e^- \dashrightarrow Z^0H^0H^0$.

A. Draw all leading order diagrams for this process.

B. Which diagram is sensitive to the Higgs tri-linear self coupling ?

C. Calculate the strength of the couplings of each of the vertices in all diagrams related to the reaction
$e^+e^- \dashrightarrow Z^0H^0H^0$.