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ZZ Vector Boson Scattering at CMS

At the Large Hadron Collider (LHC), Vector Boson Scattering (VBS) occurs when quarks from colliding protons radiate vector bosons ($\gamma = \gamma, Z$), which then interact to produce various final states. My project focuses on the ZZ final state in its fully leptonic decay ($ZZ \rightarrow \ell\ell\ell\ell \rightarrow \ell\ell\ell\ell$), where both Z bosons decay into electrons or muons. Starting from the significance measured in the 2021 CMS analysis using Run 2 data (137 fb^{-1}), it is possible to estimate the expected sensitivity using only Run 3 data. Assuming unchanged cross section and detector efficiency between the two periods, a predicted significance of 6.38σ is obtained, which would allow the observation of this process at CMS—one of the goals of my work. This poster will present the analysis strategy used in CMS and the current status of the study.

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