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The impact of an extended Inner Detector tracker on the W^+W^+ measurement in pp collisions at the High-Luminosity LHC with the upgraded ATLAS detector

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Vector Boson Scattering (VBS) has been identified as a promising process to study the nature of electroweak symmetry breaking. The best channel for VBS measurements is same-electric-charge W boson scattering: a rare Standard Model process that has a distinctive experimental signature of a same-electric-charge lepton pair and two high energy forward jets. The study of the electroweak production mechanism of $W^\pm W^\pm jj$ scattering will continue through to the High-Luminosity Large Hadron Collider (HL-LHC) physics program. During this program, the HL-LHC will not only operate at an increased centre of mass energy of 14 TeV, but also produce an instantaneous luminosity of $L = 7 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$. Several upgrades of various sub-detectors of the ATLAS detector are scheduled to cope with the intense radiation and the high pileup environment. The prospects for a $W^\pm W^\pm jj$ measurement after the LHC and ATLAS detector upgrades will be discussed, with a focus on the impact of an extended tracking detector. The effect of the upgraded Inner Detector on the measurement for the same-electric-charge $W^\pm W^\pm$ scattering process is evaluated by analysing simulated events with two leptons of the same electric charge, at least two jets and missing transverse energy.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

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