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Developments in pileup suppression techniques at the LHC

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The LHC accelerator is running at unprecedented high instantaneous luminosities, allowing the experiments to collect a vast amount of data. However this astonishing performance comes with a larger-than-designed number of interactions per crossing of proton bunches (pile-up). During 2017 values up to 60 interactions per bunch crossing were routinely achieved and capped by the ability of experiments to cope with such large occupancy. In the future an upgraded LHC accelerator (HL-LHC) is expected to routinely provide even larger instantaneous luminosities, with up to 200 interactions per bunch crossing. Disentangling the information from a single interesting proton-proton collision to the others happening in the same bunch crossing is of critical importance to retain high accuracy in physics measurements, and it is commonly referred to as pile-up suppression. In this talk I will review the main challenges and needs for pileup suppression at the LHC, mostly focusing on the ATLAS and CMS experiments; I will highlight the techniques used so far and what is planned in order to cope with the even larger pile-up expected at the HL-LHC.

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