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## CMS tracking challenges yesterday, today and tomorrow

The Compact Muon Solenoid (CMS) is one of the two general purpose experiments at the LHC. Until 2012 (Run1), pp collisions have been delivered with a minimal bunch time separation of 50 ns and a mean of about 15 collisions per bunch crossing. After the end of the long shut-down this year, LHC is foreseen to ultimately exceed an instantaneous luminosity of  $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ , which means a bunch time separation of 25 ns with a mean of more than 25 inelastic collisions superimposed on the event of interest (Run2). In this high-occupancy environment, obtaining a precise particle momentum reconstruction is one of the biggest challenges. To this end, the CMS collaboration has constructed the largest silicon tracker ever and has developed a sophisticated tracking software, that is able to successfully reconstruct the hundreds of tracks produced in each beam crossing. However, more challenges lie ahead. CERN is planning an upgrade program of the LHC collider which will bring the luminosity up to  $5 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$  after 2020. In order to face this new scenario (called Phase2), CMS will build a completely new silicon-tracker detector and will need to implement new approaches to track finding in addition to the algorithms already in use. This poster gives an overview of the iterative track reconstruction used in CMS with the performance obtained yesterday (Run1), recent tracking improvements for today (Run2), and some ideas (and foreseen results) for tomorrow (Phase2).

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