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The ATLAS Upgrade for the HL-LHC

The HL-LHC projects a leveled instantaneous proton–proton luminosity of up to 7×10−34 cm−2s with 200 simultaneous collisions within a bunch crossing (pileup) and an integrated luminosity of 3000 fb−1. These conditions require unprecedented detector technologies in terms of radiation hardness, high detection granularity and resolution, precision track timing, and powerful triggers. To meet these challenges, ATLAS pursues an ambitious upgrade programme featuring:

• an all-silicon inner tracker with today's largest five billion channel counting silicon-pixel detector and a silicon strip detector providing forward acceptance until a pseudorapidity of 4,

• a forward high-granularity timing detector featuring better than 50 ps timing resolution per hit,

• a new RPC trigger chambers in the barrel to improve the muon trigger selection,

• a new trigger and data acquisition system with 1 MHz first-level global event selection using programmable hardware and a 10 kHz second-level software selection, and

• an upgraded detector front-end and back-end electronics in the calorimeters and muon systems.

The construction of this upgrade involves thousands of ATLAS members worldwide and represents the number one priority for the collaboration.

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