

# Simulation of the ATLAS Inner Tracker

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The High-Luminosity Large Hadron Collider is due to come online sometime in 2028, delivering proton collisions at a rate four times higher than that of the current system. This environment poses unique challenges for both data collection, and detector longevity under enormous levels of radiation.

During Long Shutdown 3, expected to take place from 2026 - 2028, the ATLAS Detector will have its entire inner subsystem replaced. The current Inner Detector, comprised of the silicon pixel, silicon semiconductor tracker, and gaseous transition radiation tubes, will be replaced with a new, entirely silicon pixel and strip system, the Inner Tracker.

Each component of these new subsystems need to be modelled to ensure that an accurate simulation of the Inner Tracker is built. This allows us to understand the path of particles as they move through these new detector components, and to compare the mass of each component between simulation and engineering to ensure they have been modelled correctly.