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# Jet energy scale and resolution in the High-Granularity Timing Detector in ATLAS upgrades at HL-LHC

The large increase of pileup is one of the main experimental challenges for the High Luminosity-Large Hadron Collider (HL-LHC) physics program. HL-LHC is expected to start in 2027 and to provide an integrated luminosity of 3000fb<sup>-1</sup> in ten years, a factor 10 more than what will be collected by 2023. A powerful new way to address this challenge is to exploit the time spread of the interactions to distinguish between collisions occurring very close in space but well separated in time. A High-Granularity Timing Detector (HGTD), based on low gain avalanche detector technology, is proposed for the ATLAS Phase-II upgrade. Covering the pseudo rapidity region between 2.4 and 4.0, with a timing resolution of 30 ps for minimum-ionizing particles. The impact of HGTD in reducing pileup track contamination in the jets reconstruction in the forward region is investigated. The improvement of the jet energy scale and resolution in the forward region by reducing the pileup track contamination in hard scatter jets from nearby pileup interactions is presented. The performance is evaluated in terms of jet energy response and resolution as a function of pseudo rapidity  $\eta$ , transverse momentum  $p_T$ .

## Primary Category

Particle Physics

## Secondary Category

Instrumentation & Detectors

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