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Improving secondary vertexing for HL-LHC: Algorithm research using ACTS and ODD — •Diptaparna Biswas[1], Markus Cristinziani[1], Margret Keuper[2], Adrian Szymon Kosmala[3], Vadim Kostyukhin[1], and Paweł Swoboda[3] — [1]Experimentelle Teilchenphysik, Center for Particle Physics Siegen, Universität Siegen, Germany — [2]Data and Web Science Group, Universität Mannheim, Germany — [3]Heinrich-Heine-Universität Düsseldorf, Germany

The High-Luminosity Large Hadron Collider (HL-LHC) offers unprecedented discovery potential but introduces extreme pileup conditions that challenge standard reconstruction techniques. Accurate Secondary Vertex (SV) reconstruction is critical for precision flavour physics and BSM searches. This contribution presents research utilizing A Common Tracking Software (ACTS) to develop and benchmark robust SV algorithms tailored for this environment. While ACTS is established for tracking R&D, this work expands its scope to address the distinct complexities of vertexing. Using the Open Data Detector (ODD) for realistic HL-LHC simulations, we evaluate the performance of various algorithmic strategies, ranging from established techniques to novel approaches. We report on the current status in terms of the key metrics including vertex reconstruction efficiency, resolution and fake rates, demonstrating the viability of ACTS as a powerful platform for developing cross-experiment vertexing solutions for the HL-LHC era.

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