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Celeritas: : HEP detector simulation on GPUs

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The previous Particle Physics Project Prioritization Panel (P5) report was responsible for consolidating a set of long term High Energy Physics (HEP) programs to address scientific questions on all three Department of Energy (DOE) Cosmic, Energy, and Intensity Frontiers. Two of these efforts are the High Luminosity Large Hadron Collider (HL-LHC) and its main experiments, and the Deep Underground Neutrino Experiment (DUNE). The unprecedented scale of these endeavors demands equally challenging computing capacity and storage requirements, with a commensurate fraction of the total computing cost being driven by Monte Carlo (MC) detector simulations. To alleviate this bottleneck, we present *Celeritas*, a new GPU MC detector simulation code designed to take advantage of the massive processing power of the DOE's Leadership Computing Facilities (LCFs). With *Celeritas* we plan to bridge the gap between HEP computing frameworks and the expanding DOE LCF network, vastly increasing the total compute capacity available to experiments for MC production campaigns. Here we present a roadmap for *Celeritas*, including its architecture, physics capabilities, and strategies for its integration with existing and future experimental HEP computing workflows.

In-person or Virtual?

In-person

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