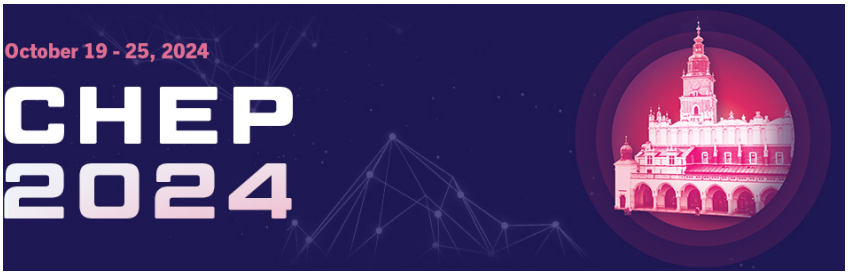

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HIGH PERFORMANCE ALGORITHMS FOR LOW POWER SUSTAINABLE HARDWARE IN HEP AT VALENCIA

Thursday 24 October 2024 17:45 (18 minutes)

In this talk we present the HIGH-LOW project, which addresses the need to achieve sustainable computational systems and to develop new Artificial Intelligence (AI) applications that cannot be implemented with the current hardware solutions due to the requirements of high-speed response and power constraints. In particular we are focused on the several computing solutions at the Large Hadron Collider (LHC), where most of the computational systems are based on CPUs, but those solutions are not scalable for the future upgrade at high luminosity HL-LHC. Experiments at Future Colliders (FC) will have to face similar computational challenges and will benefit from our outcomes. The HIGH-LOW project develops the next generation of AI algorithms for high-energy physics, specifically tailored to run in real time and in an energy efficient way. This can also help to provide computational solutions for industrial and real life applications, like autonomous cars, autonomous drones, robotics, wearable medical devices, industrial production, visual inspection of production lines and surveillance.
Our project tackles both the ecological transition to low-power hardware and the shift from serial to highly parallel computing using GPUs, FPGAs, and IPUs. This dual approach enhances the efficiency and sustainability of computational resources in high-energy physics and beyond.

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