

UCLA Department of Physics & Astronomy

COLLOQUIUM

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Investigating the energy frontier of Particle Physics while analyzing 40 million proton collisions per second in real time

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The Large Hadron Collider has recently completed its second run collecting an enormous dataset of proton collisions at the center of mass energy of 13 TeV. The new dataset provides a unique opportunity to search for heavy new particles that are predicted by several theoretical models and could not be produced in the energies achieved before. Recent results on those searches performed by the UCLA group will be presented. In parallel with data analysis, an established new instrumentation effort towards the upgrade of the CMS experiment will be presented, featuring high throughput processors built at UCLA that can analyze more than 3 Tb/s of data in real-time. Finally an extension of this instrumentation program will be presented, where similar technology targeting 5G wireless is used to perform real-time RF signal processing with applications in particle accelerators and other areas of experimental physics.