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Talk title: Jet Tagging via Particle Clouds

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[Abstract]
Machine learning techniques have brought a lot of progress in jet physics in recent years. One of the key questions in machine learning on jet physics is how to represent a jet. Inspired by the notion of point clouds, we propose a new approach that considers a jet as an unordered set of its constituent particles, effectively a "particle cloud". Such a particle cloud representation of jets is efficient in incorporating raw information of jets and also explicitly preserves permutation symmetry. Based on the particle cloud representation, we propose ParticleNet, a customized neural network architecture using Dynamic Graph CNN for jet tagging problems. The ParticleNet architecture achieves state-of-the-art performance on jet tagging problems and improves significantly over existing methods. The particle cloud representation provides a natural and generic way of representing jets and can be applied to a broad range of high energy physics problems.

[Speaker CV] Huilin Qu (UCSB)
Huilin Qu is currently a postdoctoral researcher at University of California, Santa Barbara (UCSB). Huilin obtained his Ph.D. in physics from UCSB in 2019. His research is primarily focused on the measurement of Higgs boson properties and the search for physics beyond the standard model with the CMS experiment. In addition, he is also active in the development and application of machine learning techniques for high energy physics.