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Using Data from the Large Hadron Collider in the Classroom

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Now is an exciting time for physics students, because they have access to technology and experiments all over the world that were unthinkable a generation ago. Therefore, now is also the ideal time to bring these experiments into the classroom, so students can see what cutting edge science looks like, both in terms of the underlying physics and in terms of the technology used to gather data. With the continued running of the Large Hadron Collider at CERN, and the lab's continued dedication to providing open, worldwide access to their data, there is a unique opportunity for students to use these data in a manner very similar to how it's done in the particle physics community. In this session, we will explore ways for students to analyze real data from the CMS experiment at the LHC, plot these data to discover patterns and signals, and use these plots to determine quantities such as the invariant masses of the W, Z and Higgs bosons. Furthermore, we will show how such activities already fit well into standard introductory physics classes, and can in fact enhance already-existing lessons in the topics of momentum, kinematics, energy and electromagnetism.