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Title: The search for vector-like quarks with the ATLAS  
Experiment

Abstract: One of the most pressing issues facing particle physics today is the so-called "hierarchy problem." According to the Standard Model, quantum mechanical corrections (from virtual top quarks) should cause the Higgs boson mass to blow up to a value near the Planck-scale, some 16 orders of magnitude larger than the observed value of 125 GeV. So there is either an extremely lucky cancellation that happens by chance or there is some new physics mechanism that naturally keeps the Higgs boson mass from blowing up to the Planck-scale. A wide range of beyond-the-SM theories have been proposed to solve the hierarchy problem and a common feature in many is the prediction of new particles called vector-like quarks. This seminar will attempt to explain what they are, why they are interesting, and how we search for them using the ATLAS experiment at CERN.