

Colloquium Notice

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Whither Particle Physics?

The next frontier in particle physics is the Large Hadron Collider (LHC), which, having partly recovered from an "incident" two years ago, is restarting now, following a brief preliminary run in 2010 at the European Laboratory for Nuclear and Particle Research (CERN), outside of Geneva, Switzerland. There, two beams of ~ 4 TeV protons (where $1 \text{ TeV} = 1000 \text{ GeV}$, or ~ 1000 proton masses) will be made to collide head-on, and thereby provide data that will help clarify current puzzles and inadequacies in our conceptual formulation of the nature of the fundamental particles and their interactions. The LHC will respond to specific issues raised by the apparent limitations in the logic of the "standard model (SM)," which is the current, remarkably successful theory of all particle interactions. The development of the SM is arguably the most significant achievement of elementary-particle physics! Its framework accommodates all observed phenomena within a "gauge" quantum-field theory encompassing electroweak (E&M and Weak) and strong (color - QCD) interactions. Despite that it agrees with all observations, the SM is flawed in that it has many free parameters. But even more telling is that it becomes internally inconsistent beyond TeV energies. The LHC is expected to resolve this scientific conundrum through discovery of new kinds of particles or interactions at this "Terascale." I will describe the nature of the currently disappearing energy frontier at the 1 TeV Tevatron Collider at Fermilab, outside of Chicago, and our hopes for the mightier LHC.

Monday

March 28, 2011

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326