

Illinois Mathematics and Science Academy
Great Minds Program®
presents

The Coming Revolutions in Particle Physics

featuring

Dr. Chris Quigg
Theoretical Physicist

Fermi National Accelerator Laboratory



Thursday, September 10, 2009
at 4:30-5:30 p.m.
IMSA Pearson Lecture Hall

Soon, the Large Hadron Collider at CERN will advance the experimental frontier of particle physics to the heart of the Fermi scale, reaching energies around one trillion electron volts for collisions among the basic constituents of matter. *We do not know what the new wave of exploration will find*, but the discoveries we make and the new puzzles we encounter are certain to change the face of particle physics and echo through neighboring sciences.

In this new world, we confidently expect to learn what sets electromagnetism apart from the weak interactions, with profound implications for our conception of the everyday world. We will gain a new understanding of simple and profound questions: Why are there atoms? Why chemistry? What makes stable structures possible? A pivotal step will be finding the Higgs boson and exploring its properties. But there may be much more: we have hints of other new phenomena, including some that may clarify why gravity is so much weaker than the other fundamental forces. We also have reason to believe that candidates for the dark matter of the Universe could be lurking on the Fermi scale.

Beyond the Fermi scale lies the prospect of other new insights: into the different forms of matter, the unity of quarks and leptons, and the nature of spacetime. The questions in play all seem linked to one another—and to the relationship of the weak and electromagnetic interactions. Where will the revolutions end?