Deep Inelastic Scattering (DIS) is the process by which the structure of hadrons (e.g., protons) is probed by scattering a lepton (e.g., an electron) off a quark—one of the fundamental particles found in the hadron. A lepton moving at close to light speed is smashed into the hadron and exchanges a large amount of momentum with a quark. With the extra energy from the collision, the struck quark produces a spray of particles with large mass. These particles and the remains of the hadron are then observed when they interact with surrounding particle detectors.

By analyzing the energy deposited in the detector from the scattered particles we can study the distribution of matter inside the hadron. Data gathered in DIS experiments are crucial to our understanding of the structure of the proton—a necessity for the core of the research at particle accelerators like CERN's Large Hadron Collider (LHC).

At the LHC, protons are collided to try and understand the structure of matter and the fundamental interactions between particles. Protons are excellent for these experiments: they are readily available and have electric charge, allowing for control of their motion with superconducting magnets. However, as they are hadrons with complex internal structure, we do not fully understand what is happening inside at any given time. DIS provides crucial insight we need to fully understand the results of our experiments.

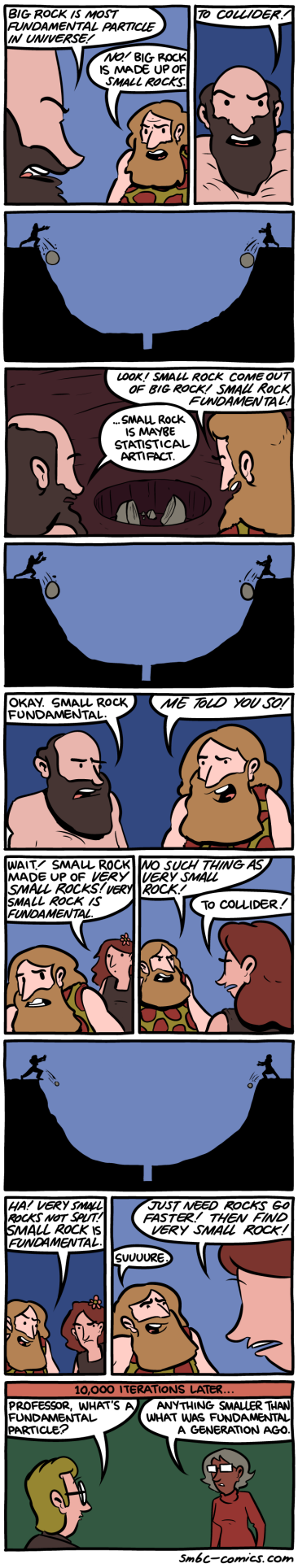

Image Credit: Zach Weiner, Saturday Morning Breakfast Cereal, #3554

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