

Ultra-Fast Magnetic Sensing for Large-Area Detection of High Energy Particles

Monday, 4 May 2015 15:30 (15 minutes)

Cascades from high-energy particles produce a brief current and associated magnetic fields. Even sub-nanosecond duration magnetic fields can be detected with a relatively low bandwidth system by latching image currents on a capacitor. At accelerators, this technique is employed routinely by beam-current monitors, which work for pulses even as fast as femtoseconds. We discuss scaling up these instruments in size, to 100 meters and beyond, to serve as a new kind of ground- and space-based high-energy particle detector which can instrument large areas relatively inexpensively. This new technique may be used to detect and/or veto ultra-high energy cosmic-ray showers. It may also be applied to searches for hypothetical highly charged particles. In addition, these detectors may serve to search for extremely short magnetic field pulses of any origin, faster than other detectors by orders of magnitude.

Summary

A new large-area detection method is proposed, which is based on magnetic detection.

Primary authors: Prof. SALTZBERG, David (University of California, Los Angeles); Mr SUN, Peihao (University of California, Los Angeles)

Presenter: Prof. SALTZBERG, David (University of California, Los Angeles)

Session Classification: Cosmic Rays

Track Classification: Cosmic Rays (Theory / Experiment)