# Interdisciplinary Instrumentation Colloquium

# From Quarks to Quasars – Advanced Scientific CCDs

Speaker: Stephen Holland
Engineering Division, LBNL

Date: Wednesday, June 15, 2005
Time: 4:00 PM (refreshments at 3:45)
Place: LBNL, Building 50 Auditorium
(directions at http://InstrumentationColloquium.LBL.gov)

Semiconductor detector R&D for high energy physics provided key technologies for novel charge coupled devices (CCDs) in astronomy. LBNL CCDs have been utilized in astronomical observations at ground-based telescopes and are a key component of the proposed SuperNova Acceleration Probe (SNAP). High-resistivity silicon CCDs operated with a substrate bias voltage provide 200-300 micrometer thick active volumes that significantly improve near-infrared response over conventional devices. The fully depleted operation results in good spatial resolution. I will explain the principles of CCDs, discuss the unique character-istics and technological challenges of fully depleted devices, and outline their fabrication in the LBNL MicroSystems Lab. 12.3 megapixel CCDs with improved radiation hardness have been produced for SNAP. As a spin-off of this effort we have demonstrated full depletion of 650 micrometer thick CCD's, which allows efficient detection of x-rays in the 10-20 keV range. Devices with increased readout speed are targeting applications in materials science, biology, and high energy physics. Although CCDs were invented over 35 years ago and are now a widespread commodity, new developments are opening an expanding range of scientific applications.

Presentations (pdf files) and dates of future colloquia are posted at
http://InstrumentationColloquium.LBL.gov

Suggestions for speakers and topics are welcome. Please contact
Helmuth Spieler spieler@LBL.gov

Please direct questions regarding site access to
Cathy Thompson CAThompson@LBL.gov Tel. 510-486-5421
Dianna Jacobs DJacobs@LBL.gov Tel. 510-486-5146