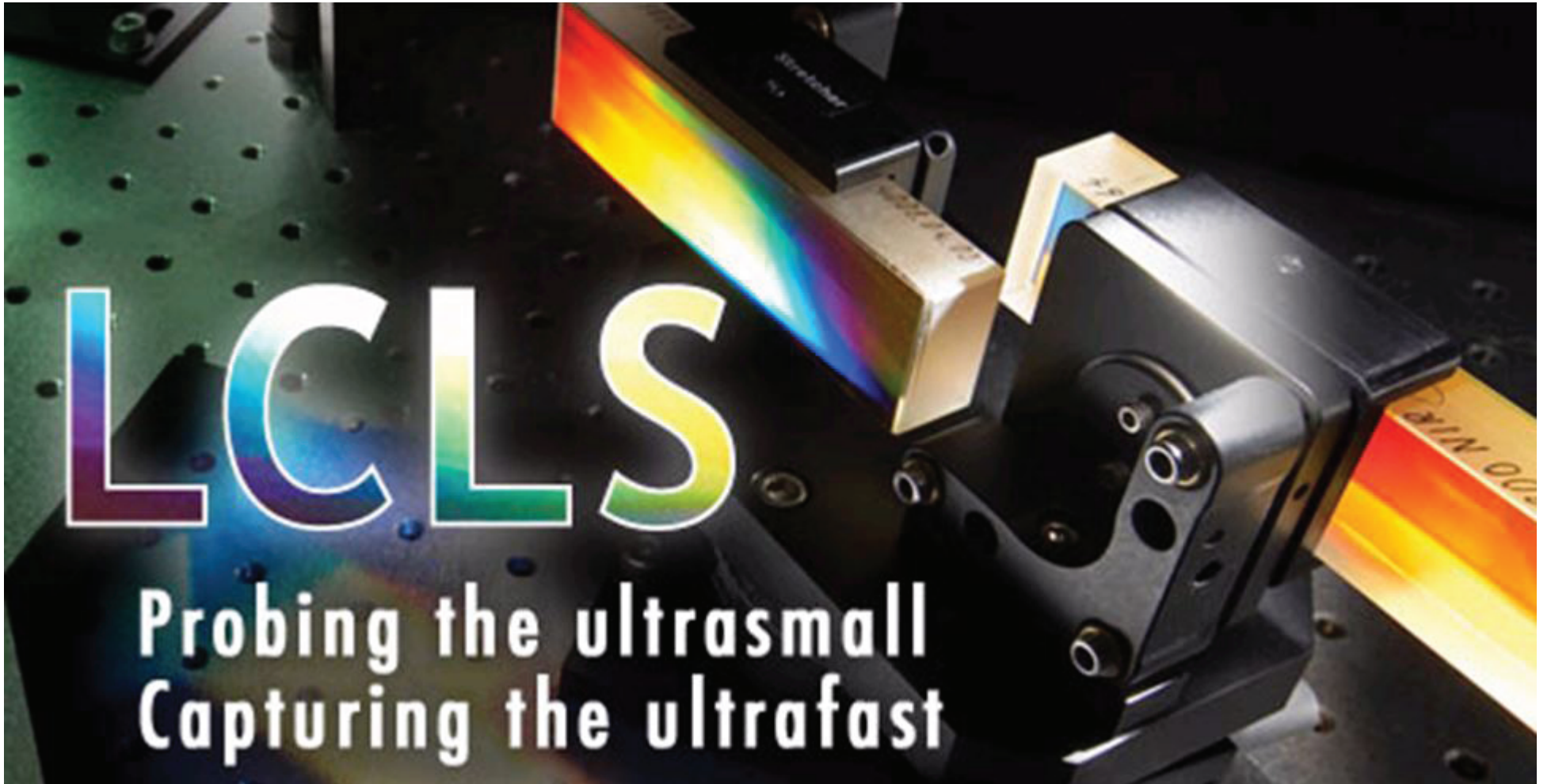


Paul J. Emma

LCLS-I Experience and LCLS-II Plans



SLAC has had spectacular success with the start-up and operation of the Linac Coherent Light Source (LCLS); a free-electron laser (FEL) based on the final kilometer of the existing SLAC linac. This success, and the science it has enabled, have motivated a new effort to extend this machine into a larger facility based on a superconducting, high-rate linear accelerator to be installed in the first kilometer of the SLAC tunnel, with two new adjustable-field undulators focused on both hard and soft coherent x-ray production at up to 1-MHz pulse rates. This presentation will highlight the LCLS experience, focusing on new methods that have been developed to provide FEL self-seeding, extremely short x-ray pulses, variable double pulses, two-color pulse generation, femtosecond-resolution diagnostics, and x-ray polarization control. At the same time, SLAC is engaged, with its several partner labs, in the design and planning for LCLS-II construction, which will greatly extend the scientific capabilities of the existing facility. This presentation will also provide some overview description of this new facility.

Paul Emma is a Senior Staff Scientist at SLAC where he has been engaged in the field of accelerator physics since 1988. Prior to this he was a member of the Accelerator Operations Group at Fermilab during the Tevatron commissioning effort in 1982-1987. His work at SLAC has included commissioning and operations work at the Stanford Linear Collider (SLC), a 50-GeV electron-positron linear collider based on the SLAC linac; the accelerator design effort for the Next Linear Collider (NLC), a design study that was not constructed; and most recently as the accelerator design and commissioning leader for the Linac Coherent Light Source (LCLS) at SLAC. He is a Fellow of the American Physical Society, and has been awarded the 2009 International Free-Electron Laser Prize, and the Innovation in Synchrotron Radiation award from the Helmholtz Center in Berlin. He is presently involved in the design effort for the LCLS-II.

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