Advanced Instrumentation Seminars

June 25, 2008
1:30 pm, 1st Floor
KAVLI Auditorium

Synchronicity:
High Precision Timing and Synchronization for Next Generation Light Sources

Guest Speaker –
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The next generation of light sources (FELs and ERLs) require exquisite coordination among the accelerator and laser systems in order to achieve high electron and x-ray beam quality . This is particularly true for FELs producing intense x-ray pulses with durations of about 100 femtoseconds or less. To use these x-rays in pump-probe experiments, it is important to synchronize optical lasers to the x-ray pulses to less than 100 fsec or even less in the case of seeded FELs. Furthermore, to produce the high quality beams needed, it is necessary to synchronize the accelerating sections to a few hundred femtoseconds. I will summarize recent developments to achieve this level of synchronization and focus on our approach in Berkeley. We have developed optically stabilized fiber links to transmit timing information. We have succeeded in synchronizing independent links of several kilometers to the femtosecond level. These links are planned for installation in the LCLS over the next year.

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