Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, 25.06.2013

(16:00 in Room 459/30b)

LCLS Operation in Self Seeding Mode

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SLAC

Abstract

The Linac Coherent Light Source (LCLS) produces typically SASE FEL pulses with an intensity of up to 5 mJ and at high photon energy a spread of 0.2% (FWHM). Self seeding with a diamond crystal reduces the energy spread by a factor of 10 to 40. The range depends on which Bragg reflection is used, or the special setup of the electron beam like over–compression. The peak intensity level is lower by a factor of about five, giving the seeded beam an advantage of about 2.5 in average intensity over the use of a monochromator with SASE. Some experiments want to scan the photon energy, which requires that the crystal angle be carefully tracked. At certain energies and crystal angles different lines are crossing which allows seeding at two or even three different colors inside the bandwidth of the SASE pulse. Out–off plane lines come in pairs, like $[1-13]$ and $[-113]$, which can be split by using the yaw angle adjustments of the crystal, allowing a two-color seeding for all energies above 5 keV.

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