

Virtual Hard X-Ray FEL Collaboration Seminar Series

Date: Thursday 21st January 2021

Title: First results of LCLS-II VGU commissioning & Undulator Tuning for Movable Gap Undulators

Speaker: Heinz-Dieter Nuhn, SLAC

Abstract:

In 2020, two new LCLS-II variable gap FEL undulator systems have been brought into operation at the SLAC National Accelerator Laboratory with electron beams from the SLAC copper linac for bunch repetition rates of up to 120 Hz. Both of these undulator lines operated at near full capacity for the set of electron beam parameters at the first attempt without the need for tuning of undulator parameters other than taper to increase x-ray beam intensities. Tuning was necessary for injector, linac and transfer line components, though. X-ray pulse intensities as high with 2.75 mJ with 27 undulator segments were reached at 10.52 GeV and 180 pC on the hard x-ray line and 5.1 mJ with 21 undulator segment at 7.15 GeV and 180 pC on the soft x-ray line after the emittance was lowered to LCLS-levels. The talk will address how careful tuning, calibration and alignment of each individual undulator segment and phaseshifter made this possible. The discussion will also include automatic phaseshifter settings and photon energy control.