

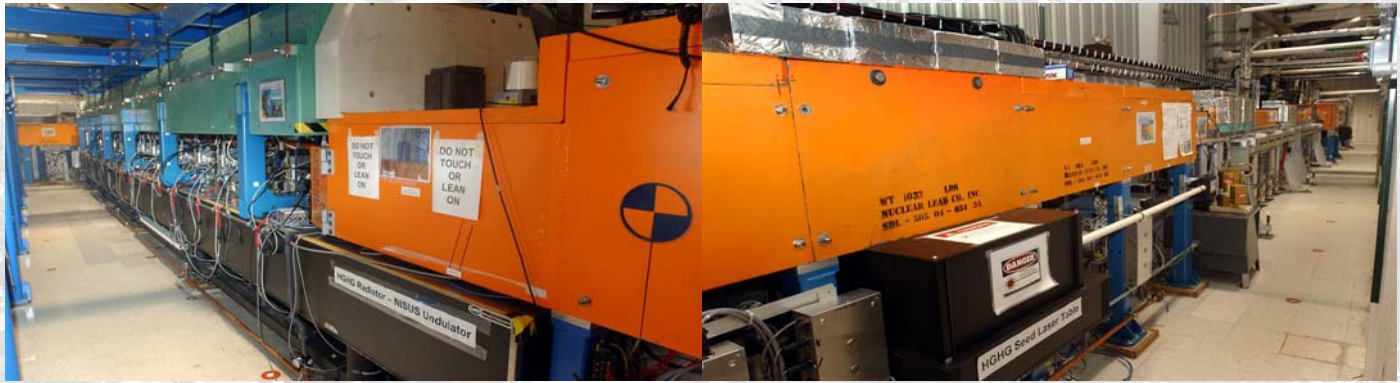
# GFA and SwissFEL Accelerator Seminar

## Beyond SASE and Saturation

Monday, 6 December 2010, 16.00 h, WBGB/019

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Self Amplified Spontaneous Emission (SASE) FEL has achieved saturation from Infrared radiation (IR) to the hard X-ray. One of the challenges now facing the FEL community is to further improve the FEL performance. We have been exploring various techniques at NSLS SDL to improve FEL performance beyond SASE and saturation: from the laser seeding to ultra-short electron beam generation. After the discussion of basic properties of a laser seeded FEL, I will present two recent experimental results from SDL: Coherent (single-spike) SASE and Tapered FEL. SASE spectral evolution in both linear and saturation regimes were investigated in our coherent SASE experiment, instead of spectral narrowing we observed constant spectral in the exponential gain regime. In the tapered FEL experiment, we have experimentally demonstrated a tapered undulator can be used not only to improve the fundamental FEL output efficiency, but also the harmonic output efficiency. Further more, we also demonstrated that the tapering could also be explored to preserved both the longitudinal and transverse coherence of FEL pulse beyond the saturation.