Intra-beam scattering and the ultimate seeding wavelength in EEHG

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Echo Enabled Harmonic Generation (EEHG) has a promise of generating extremely high harmonics of the seed laser in soft x-ray FELs. An important question is: what is the physics limitation of the maximally achievable harmonic number in the EEHG seeding? While it is realized that higher harmonics require stricter tolerances on the magnetic system, laser parameters and control of beam properties, these tolerances do not impose a definite limit on the maximal harmonic number. In this talk, I will argue that the physical mechanisms that set such a limit are the intra-beam scattering and incoherent synchrotron radiation in the seeding system.