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Anticipated limits on machine stability and consequences on machine and beamline designs

With the small emittance the future USRs will provide, the beam stability is going to be more and more a critical issue. I will compare a ±sigma/10 position stability tolerance for a 30 keV diffraction limited photon beam to the actual beam stability of an existing light source. The future USRs might or not achieve a better stability. We will see that for acquisition times from 10 ms to about 10 s a ±100 nm stability requirement can be met. For shorter or longer acquisition times, photon beam position and angle feedback systems will likely be necessary. I briefly report on a state of the art BPM and orbit feedback system; on stable supports made of INVAR for BPM; and of a high performance hydrostatic leveling system (HLS).

Primary author: Mr DENARD, Jean-Claude (Synchrotron SOLEIL)

Presenter: Mr DENARD, Jean-Claude (Synchrotron SOLEIL)