



ID de Contribution: 31

Type: Poster

## Study and optimisation of the non-linear and 6D dynamics of an electron beam in an ultra-low emittance storage ring

The SOLEIL synchrotron is the French national third generation light source storage ring, which provides photon beams to 29 beamlines from infrared to hard X-rays. Future synchrotron sources aim at increasing the brilliance by decreasing the electron beam emittance, down to the natural diffraction limit: they are Diffraction Limited Storage Rings (DLSRs). In order to improve its performance and allow access to new experiments, an upgrade of the SOLEIL 2.75GeV storage ring is under study, and aims at decreasing the horizontal electron beam emittance by a factor 40 at least.

After a brief review of the state-of-the-art of the synchrotron light sources and their applications, this contribution presents two new layouts of magnet lattice, optimised by means of multi-objective algorithms. Eventually, the results of such optimisation process will be discussed in details.

### Field

Accelerator physics/Soleil

### Language

English

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**Classification de Session:** Lunch & Posters session

**Classification de thématique:** Physics