



Contribution ID: 101

Type: talk

MariX: a Multi-disciplinary Advanced Research Infrastructure for the generation and application of X-rays

Wednesday, 18 September 2019 18:40 (20 minutes)

We present the conceptual design of a new, advanced radiation source facility called MariX (Multi-disciplinary Advanced Research Infrastructure for the generation and application of X-rays). The facility has been conceived, following a scientific case delineated by users of FELs and Light Sources, for delivering fs-scale, high repetition rate, X-ray pulses for time-resolved fine analysis of matter (spectroscopy and photon scattering) in the linear response regime. MariX is based on the original, advanced design of a two-pass two-way superconducting linear electron accelerator, equipped with an arc compressor, able to significantly reduce both footprint and construction/operation costs, although employing conventional super-conductive cavities. MariX will be operated in CW mode (1 MHz) providing FEL emission in the 0.2 - 8.0 keV range with 10^8 photons per pulse. The accelerator complex also includes an advanced inverse Compton source of very high-flux hard X-rays of energies up to 180 keV at 100 MHz repetition rate for realizing a broad science program and serving a multidisciplinary user community, covering fundamental science of matter and application to life sciences, including health at pre-clinical and clinical level.

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Session Classification: WG4 - New Facilities, laser wakefield betatron for QED and HED

Track Classification: WG4 - Application of compact and high-gradient accelerators