

MariX/BriXS Design Study: a combined ultra-high flux X-ray FEL and Compton Source

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We are developing a Design Study for a combined X-ray source system spanning the 0.3-150 keV photon energy range with un-precedented characteristics of brilliance, flux and coherence. The machine is based on an innovative scheme combining a compact 100 MeV energy recovery Super-Conducting Linac and a 1.5 GeV two-pass CW-SC Linac that can boost the electron beam energy up to 3.8 GeV via a newly conceived bubble-shape arc compressor. The radiation beam lines under design will generate mono-chromatic X-rays in the 20-150 keV range via Compton back-scattering, with fluxes up to 10^{13} photons/sec in 100 MHz rep rate pulses (ps-long), and Free Electron Laser photon beams in the 300 eV – 12 keV (1 Angstrom) range with coherent femto-second pulses at 1 MHz rep rate and up to 10^{17} photons/sec. MariX (Multi-disciplinary advanced research infrastructure with X-rays) is conceived to be developed in the context of the new Scientific Campus that Università degli Studi di Milano is planning to build in the Milan Expo area within the next 5-6 years. We will illustrate the main rationale of the MariX design study and its C.D.R. under preparation, as well as the main guide lines of the FEL scientific case and the Compton source clinical and scientific case (see also <http://www.fisica.unimi.it/ecm/home/ricerca/marix>).