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LAPLACIAN: A Step Forward for Compact LPA Based Electron Accelerators

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The LAPLACIAN (Laser Acceleration Platform as a Coordinated Innovation Anchor) experimental facility inside the MIRAI project framework is the Japanese answer to the global effort for the development of compact accelerators based on laser plasma acceleration (LPA) for its application to free electron laser (FEL). Situated in the SPRING-8 site, LAPLACIAN aims for the generation of X-ray FEL with relativistic electrons (GeV) from an LPA source in a beamline of under 10 m. Even after the recent demonstration of by the SIOM group, achieving proper electron beam parameters in a consistent manner and a reliable coupling with the undulator is non-trivial and still under research. In LAPLACIAN, multiple gas targets and LPA schemes are being studied, including a planned multiple plasma stages setup for GeV electron energies combined with magneto-optics for coupling. In this talk, an overview of the current facility status and some future plans will be given. In addition, we will report in some of the already achieved results and the new planned beamline.

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