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SPARC_LAB recent results and future perspectives

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The SPARC_LAB test facility hosts a 150 MeV high brightness electron beam injector, which drives a FEL source, a THz radiation user beam line and an X-ray Thomson backscattering experiment. A particle driven plasma acceleration (PWFA) experiment is also under way. In parallel to that a 200 TW laser is linked to the linac and is devoted to explore laser-matter interaction, in particular with regard to laser-plasma acceleration of electrons (LWFA) and of protons. Plasma-based acceleration has already proved the ability to reach ultra-high accelerating gradients. However the step towards the realization of a plasma-based accelerator still requires some effort to guarantee high brightness beams generation, diagnostics, stability and reliability. We describe in this talk the recent results in this regard achieved at the SPARC_LAB facility and the future perspective.

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