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## **Laser plasma accelerator-based soft X-ray FEL development at ELI-Beamlines**

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Modern linac-based free electron lasers (FEL) opened a new area of scientific research in physics, chemistry, biology and material sciences. In recent years laser plasma accelerator (LPA) technology has made great progress towards compact electron 'GeV-energy scale' accelerators. Combination of compact LPA accelerator with well-established technologies to build dedicated electron beam transport and undulator beam-line opens a possibility to extend ability of existing FEL facilities delivering a photon beam with unique and novel properties for the worldwide photon user community. Development of the laser-plasma accelerator based soft X-ray FEL at ELI-Beamlines (Czech Republic) will extend ERIC-ELI capabilities in multiple science fields such as laser technology, plasma accelerators and photon science technology. In the frame of this report we will present a conceptual solution of the entire setup from the high-power high-repetition rate laser up to the photon beamline aiming to deliver to the user area the coherent photon beam with the wavelength in the soft X-ray range (3-4.5 nm for the fundamental harmonic) and the peak brilliance, comparable with existing soft X-ray FELs. Challenges, R&D program needed in order to develop such user-oriented setup and connection with the EuPRAXIA (European Plasma Research Accelerator with eXcellence in Applications) project will be discussed.

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### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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