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Status of the Swiss Muon Source at PSI

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The Laboratory for Muon Spin Spectroscopy (LMU) at PSI develops and operates the six muon instruments of the Swiss Muon Source (Smu;S). We give an overview of the current status, with an update on the commissioning of the new FLAME instrument and the upgrade plan of the μ ;E4 beamline to increase the rate of low-energy muons by 50% in 2025. Furthermore, a new experimental facility is under development: the Muon-Induced-Xray-Emission (MIXE) instrument using negative muons for non-destructive, depth-selective elemental analysis of archeological artefacts, extraterrestrial samples and for operando studies of devices.

On a longer term, PSI is planning the major upgrade project IMPACT of the High-Intensity Proton Accelerator (HIPA). IMPACT ("Isotope and Muon Production using Advanced Cyclotron and Target technologies") aims for the production of radioactive isotopes for cancer diagnosis and therapy, and the installation of HIMB, the two "High Intensity Muon Beams". HIMB involves the replacement of the existing target M and the two beamlines π ;M1 and π ;M3 by a new target H with two very high-intensity surface muon beamlines μ ;H2 and μ ;H3 with muon rates up to 10^{10} /s. This will offer unique new possibilities for muon applications [1]. Installation of this major facility upgrade is foreseen in a 1.5 years shutdown in 2027/2028. The project proposal is currently being under evaluation.

[1] M. Aiba et al., Science Case for the new High-Intensity Muon Beams HIMB at PSI, arXiv:2111.05788.

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