

The Paul Scherrer Institut builds, operates and develops particle accelerators as user facilities. These research infrastructures provide beams of photons, neutrons and muons to a wide international research community. In order to maintain these facilities at the peak of their performance a number of technical infrastructures are required for key components, some of which are described below.

Test beam facilities



SwissFEL linac test facility

This facility will contain key elements of the SwissFEL RF system (structures, RF sources, modulators) which will be used for maintenance and development of the linac. The upper photo shows the bunker when it contained the test injector. The lower picture shows the bunker from above the shielding.

500 MHz RF cavity test stand



The Swiss Light Source exploits a test stand for 500 MHz RF in which new RF cavities, power couplers and amplifiers can be tested / developed: (r) 500 MHz cavity in its shielding (l) solid-state amplifier under development.

C-band structure test stand



For PSI's SwissFEL project the laboratory has built an infrastructure which contributes to the production of the C-band (5.7 GHz) accelerating structures needed for the project. This production facility allows the metrology, stacking, brazing, and testing of high precision machined copper discs provided by industry. The photo, above-left, shows the vertical brazing furnace. Above right, one sees four 2 m long structures under high power test. The infra-structure is currently solicited by major European laboratories for the production of S-band (3GHz) and X-band (12 GHz) structures.

Characterization and measurement laboratories



The laboratory has a number of test stands available for the development of advanced diagnostics, ultra-fast synchronisation systems, electronic processor boards, control hardware and fast digital feed-back systems. The photo on the left shows an equipment rack built for tests in series of button beam position monitors, built at PSI as part of Switzerland's in-kind contribution to the European X-FEL project.

Electron cyclotron resonance source test stand.



Test stand for the development and characterisation of proton sources for the PSI proton cyclotron.

50 MHz RF test stand



The large 50 MHz resonators for the injector ring and main ring of the high intensity proton accelerator require a test facility to measure their performance and to test low level RF control systems with them. The picture on the right shows one of the new Injector resonators built as part of the HIPA up-grade.

Magnet measurement test stand



The magnet test stand is a 3-axis hall probe with "sensing" volume of 100x100x100 μm cubed mounted on a long lever arm. The 'inset' shows a close up of the probe.

Ultra-high vacuum test laboratory



In order to ensure that all accelerator components meet the strict vacuum requirements imposed upon them we have a fully equipped vacuum test laboratory in which vacuum chambers can be qualified before installing them in an accelerator or on a beamline.

