Contribution ID: **33** Type: **Oral presentation**

Status of the rf-system for the high intensity proton accelerator facility at PSI

Thursday, 15 May 2014 16:30 (30 minutes)

This year PSI celebrated the 40 years anniversary of the Ring cyclotron. This is the main accelerator of the high intensity proton accelerator facility, where protons are accelerated up to 590 MeV. In several upgrade programs the beam current was increased from the initial design value of 100 μA up to 2.4 mA. The rf-system of this separated sector cyclotron consists of 4 copper cavities running at 50 MHz for the main acceleration. To increase the phase acceptance of the Ring, an aluminium flattop cavity is operated on a gap voltage of 555 kVp at the 3rd harmonic frequency.

In 2013 after half a year of regular operation the flattop cavity caused about 3 weeks of unscheduled downtime. Multipactoring discharges overheated the finger contacts on the coupling loop. A description of the observed phenomena and the taken actions will be presented.

The Injector 2 cyclotron is the preaccelerator for the Ring. An upgrade program on the rf-system will replace the two flattop cavities (150 MHz) by accelerating cavities (50 MHz). This program includes the replacement of amplifiers, for those the tubes are no longer produced by the supplier. A status report of this project will be given.

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Session Classification: Thursday afternoon 2

Track Classification: SPC judgements