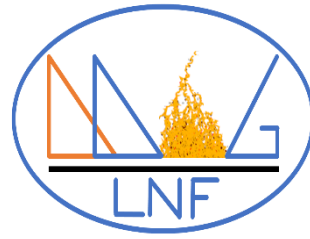


Test Beam @ PSI



2018

2019



Beam requests & Responsible

- Deadline for submission and beam request: January 2020
- Beam Time Coordinator:
Stefan Ritt

Guidelines for submitting new proposals

The **cover page** of the proposal should contain the title, a list of authors with their affiliations and a summary (abstract) of the full experiment.

The **second page** should contain the beam and area requirements:

- beam line, area, special facilities (separators, SC magnets, cooling water)
- amount of required electrical power in area
- beam properties (type of particle, intensity, momentum...)
- duration of the experiment (time for setting up, tests, production runs)
- any special conditions
- beam time request for the first beam period after approval

The **third page** should consist of the declaration sheet for hazardous samples/equipment ([PDF](#), [Word](#)). This does not replace a detailed description of safety questions in the full text of the proposal.

The **main part** of the proposal should contain the exact description of the experiment:

- Motivation, physics and other goals. Comparison with other experiments and theory.
- Principle of the measurement, its technique and apparatus.
- Proposed measurements, milestones, expected performance and rates.
- Estimate of beam time needed for each step.
- Involvement of the contributing partners in terms of manpower (with percentage of each person), and finances.
- Requests from PSI : manpower (workshop), finances, special equipment.

An electronic copy (preferably as a PDF file) should be sent before the deadline to stefan.ritt@psi.ch.

If you need beam time for the forthcoming period, please fill out and send us the beam time request form.

Paul Scheerer Institute: beam request

Secondary beam lines for beam test

Quasi-continuous secondary beam: bunch frequency 50 MHz

Call for New Proposals/Letters of Intent/Beam Requests for Experiments or Tests using PSI's Pion, Muon and Ultracold Neutron Beams

BV 51 - Benutzerversammlung Ring
Next Users' Meeting Ring: January 27 - 29, 2020

Submissions and beam requests
Deadline for submissions and beam requests: **January 13, 2020**

Program

Form

PSI are normally available free of charge to user groups of universities and research laboratories. A mission of external users is the readiness to publish the scientific results in internationally accepted staff members involved in the experiments as well as proper mention of the PSI facilities.

Time must first submit research proposals which are reviewed by an international committee and proposals, as well as letters of intent or beam time requests for approved experiments and hard-

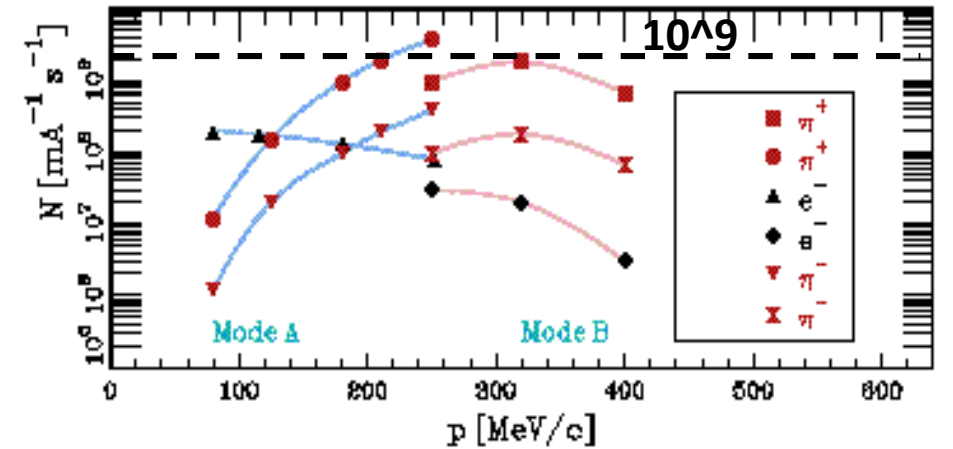
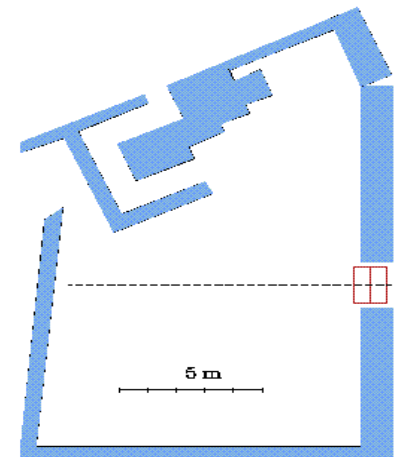
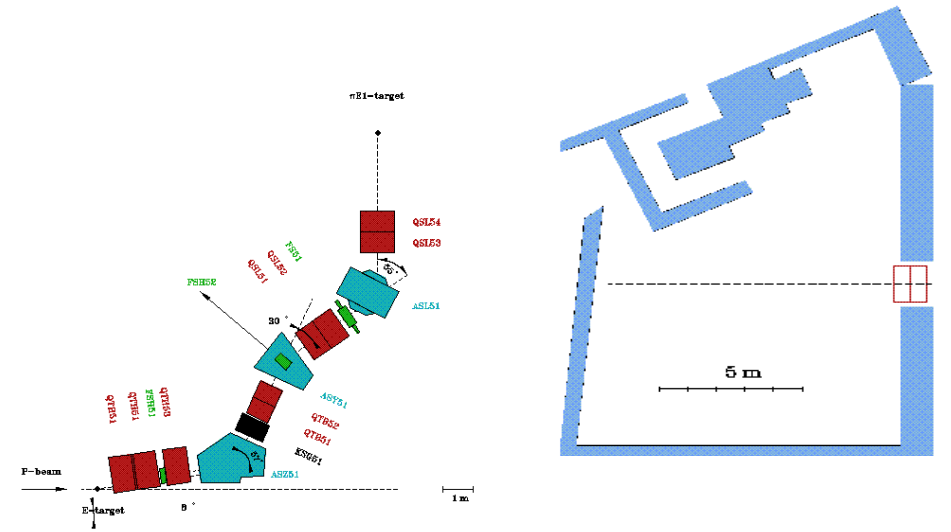
Area	Target	Momentum Range MeV/c	Momentum Resolution % FWHM	Particle Type	max. π flux 1/s
$\pi E1$	E	10-500	0.26	Pions, Muons	1×10^{10}
$\pi E5$	E	20-120	2	Pions, Muons	2×10^{10}
$\pi M1$	M	100-500	0.1	Pions, Protons	4×10^8

Following Secondary Beam Lines are available for nuclear and particle physics experiments.

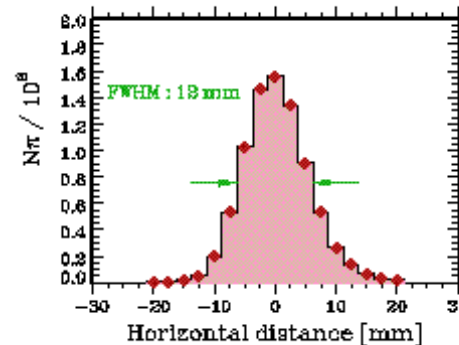
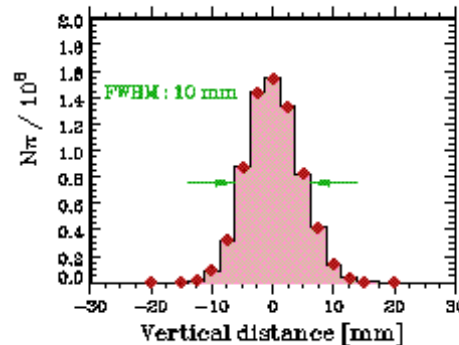
Area	Target	Momentum Range MeV/c	Momentum Resolution % FWHM	Particle Type	max. π flux 1/s
$\pi E1$	E	10-500	0.26	Pions, Muons	1×10^{10}
$\pi E5$	E	20-120	2	Pions, Muons	2×10^{10}
$\pi M1$	M	100-500	0.1	Pions, Protons	4×10^8

$\pi E1$ Beam Line

- High intensity pion and muon beams with momenta ranging from 10 to 500 MeV/c
- Two optical modes of operations are available :
 - Mode A provides high flux with low momentum resolution. Its momentum is limited by the focussing strength of the first quadrupoles to values lower than 280 MeV/c
 - Mode B is a low acceptance, high momentum resolution version up to momenta of 500 MeV/c

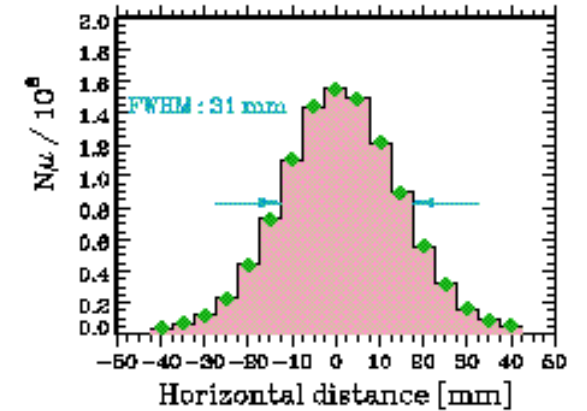
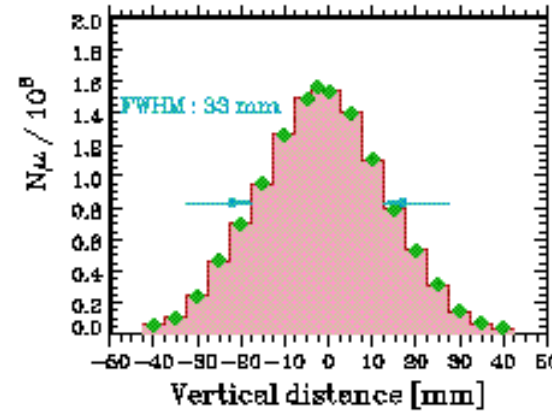
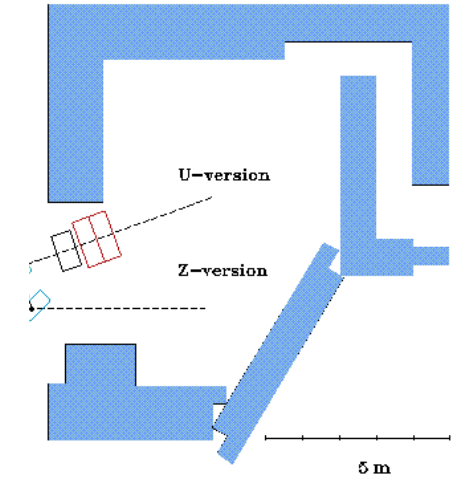
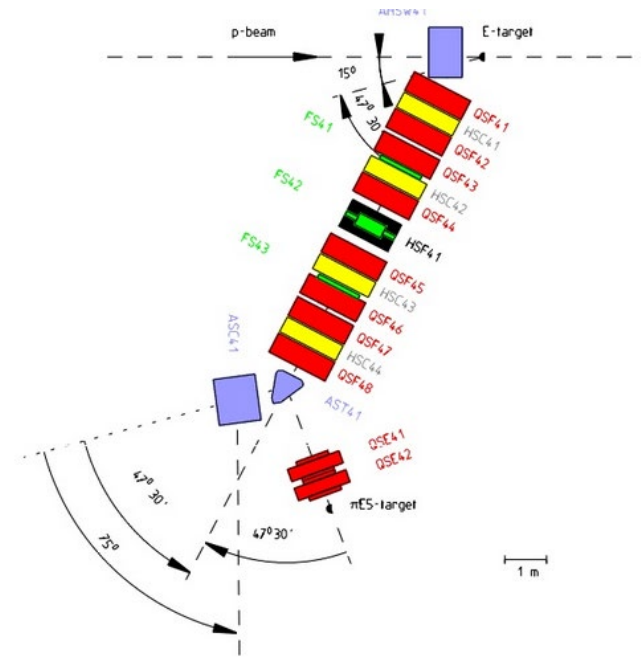
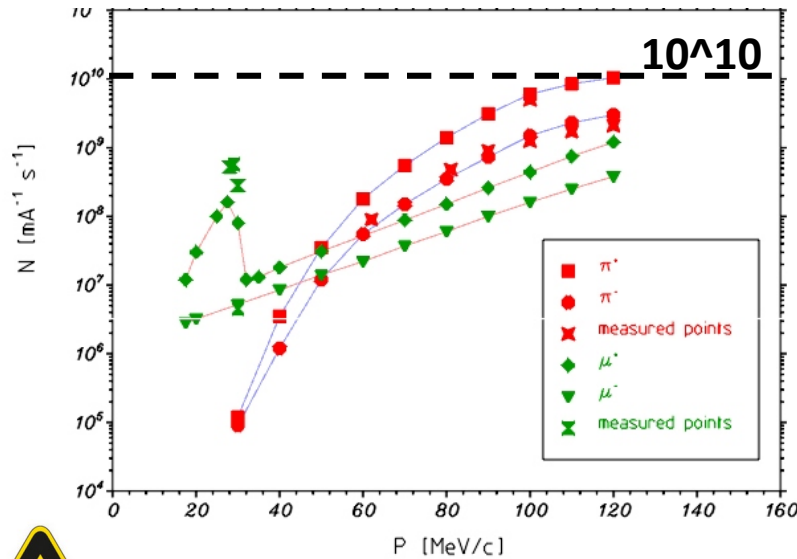


- Spot size > 10 mm



π E5 Beam Line

- low energy (10-120 MeV/c) pion and muon beam line
- High particle flux ($>10^{10}$)
- Spot size > 30 mm

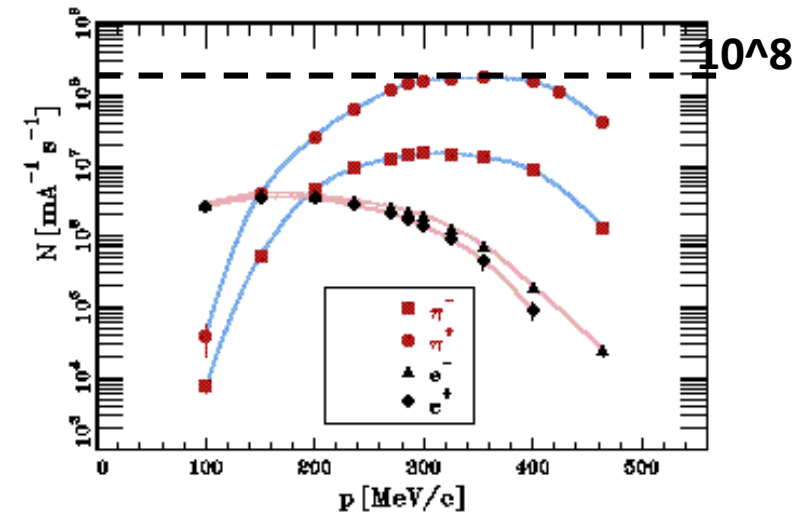
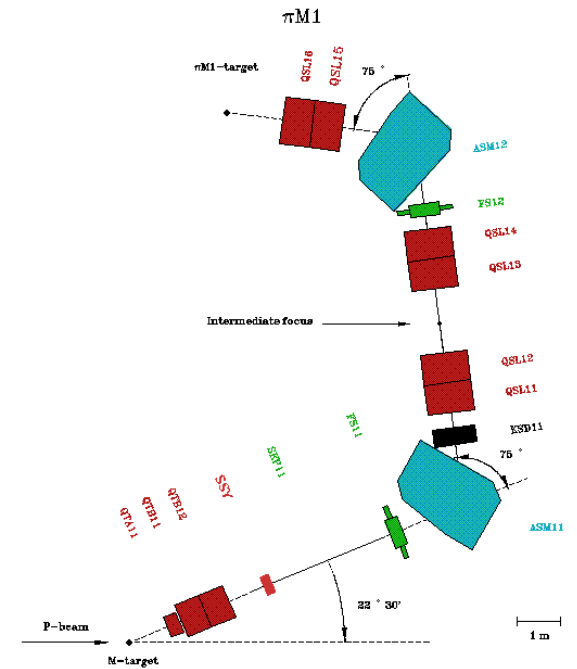


In the π E5 beam line a high neutron background is present: 150 neutrons $\text{mA}^{-1} \text{s}^{-1} \text{cm}^{-2}$ at energies larger than 120 MeV, and low energetic neutrons, which produce a radiation level of $50 \text{ mS mA}^{-1} \text{h}^{-1}$.

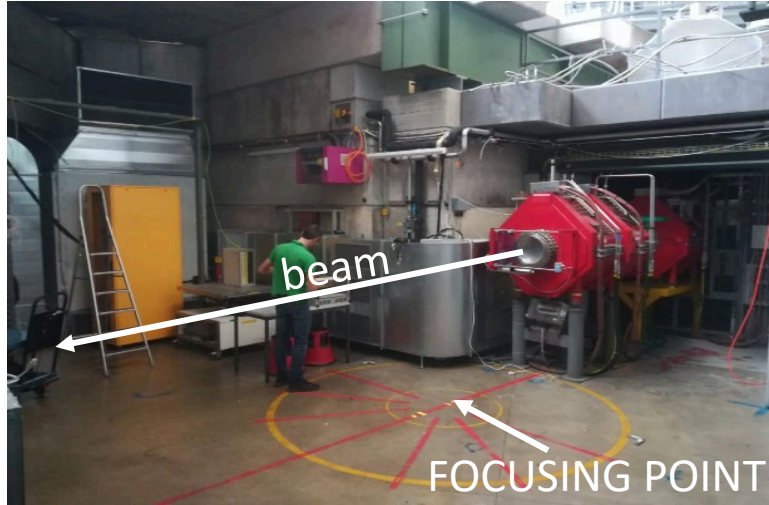


π M1 Beam Line

- High resolution pion beam line with a momentum ranging between 100 and 500 MeV/c
- Very high pion rate up to 200 MHz @ 350 MeV/c
- Proton contamination < 10% @ 350 MeV/c
- Spot size up to 7-8 cm²



π M1 Beam area/control room

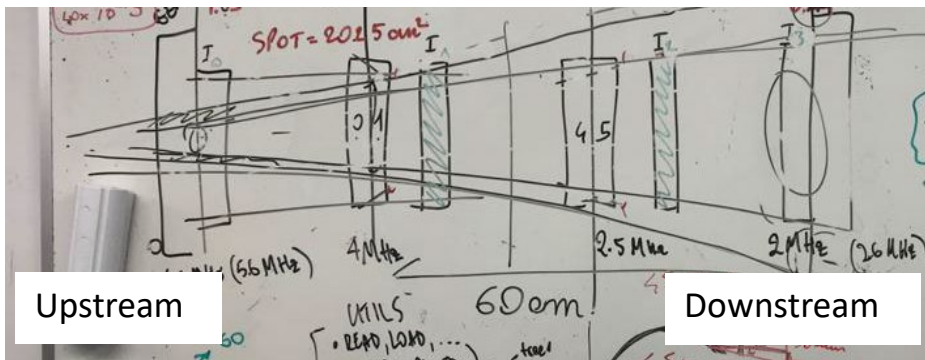


Space available in the area (4-5 m along the beam)



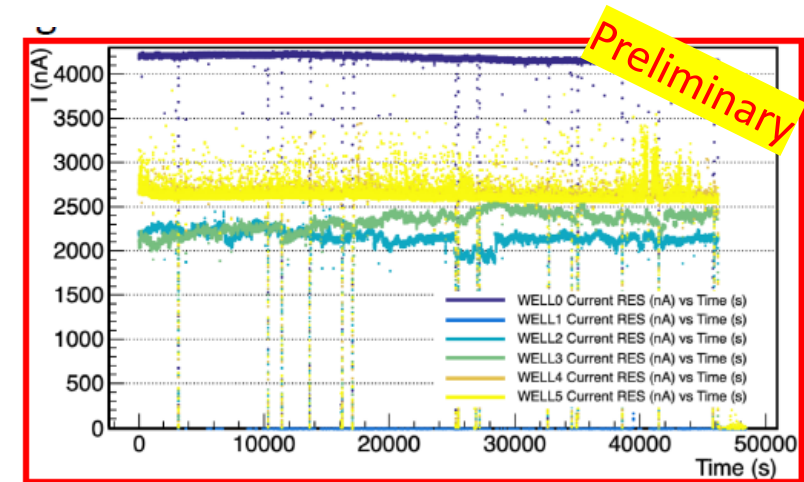
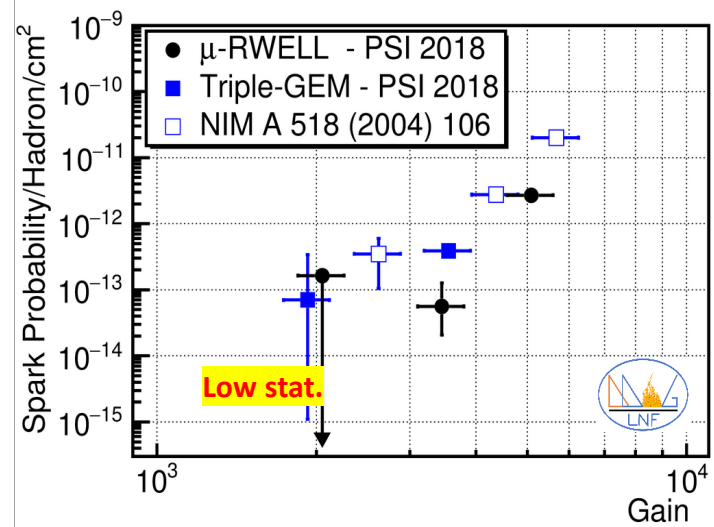
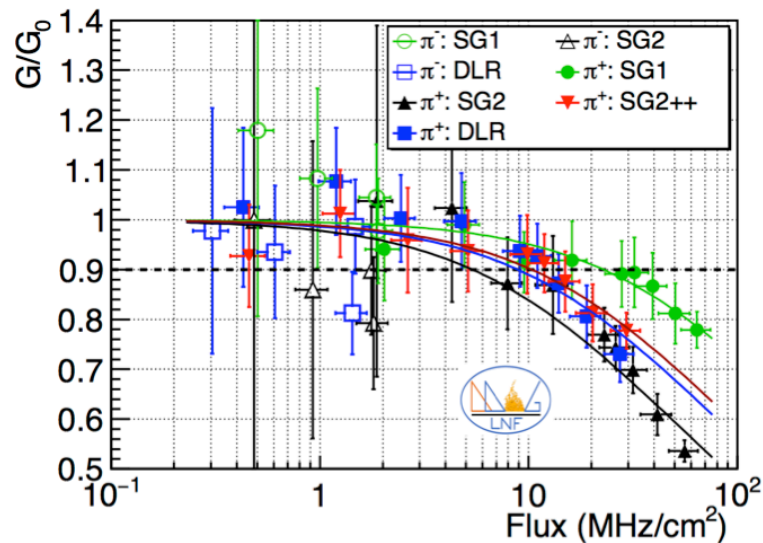
Our setup in π M1 area: a tracker system + 10 u-RWELL on a movable XYZ table + rack+SRS+ power supply, etc

Beam divergence (x2 particle rate between Up and Downstream)
if the setup isn't in the focusing point



Our experience: high particle flux mode

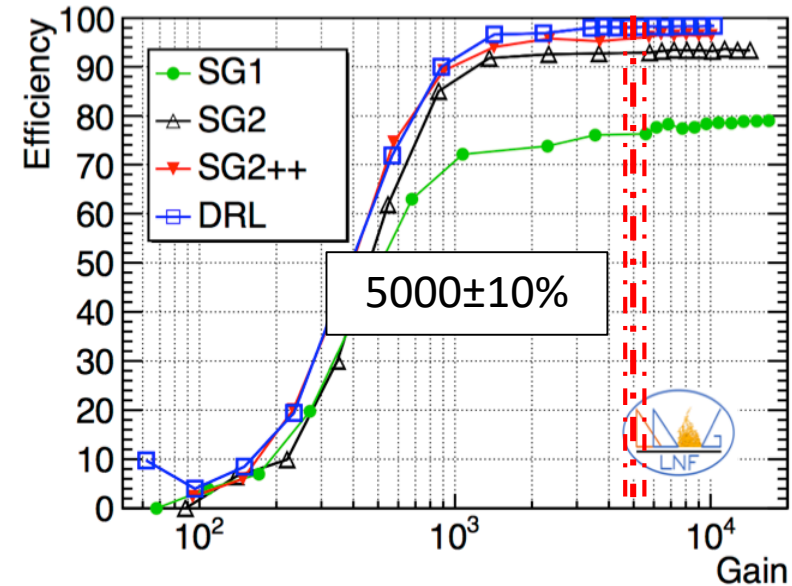
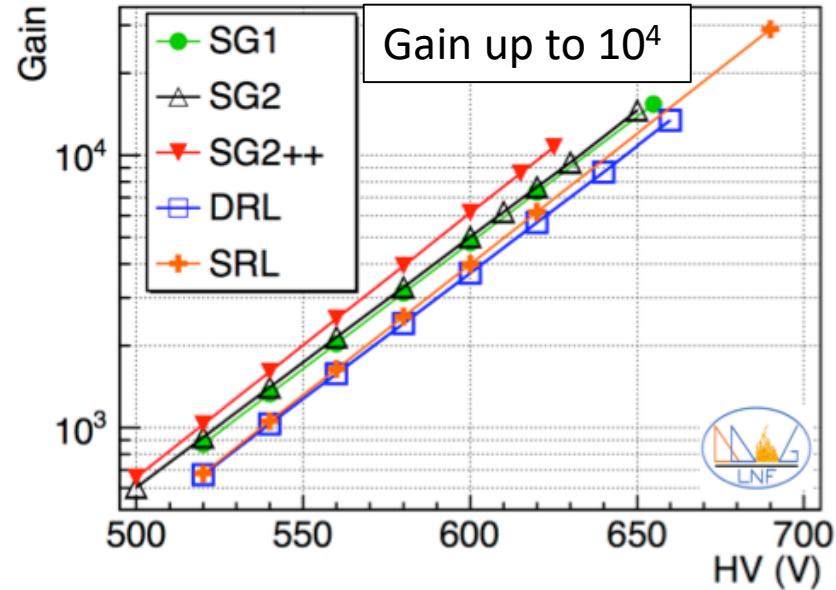
- π M1 is one of the best beam line to perform rate capability study, discharge probability measurement (2018) and radiation studies (2019)
- Rate up to 20 MHz/cm² and beam spot up to 8 cm²



A NO-resistive MPGD or Ionization Chamber is mandatory to measure the particle flux
The use of SRS+APV is possible with the internal trigger, but track reconstruction becomes complex and time consuming (high particle pile-up)

Our experience: low particle flux mode

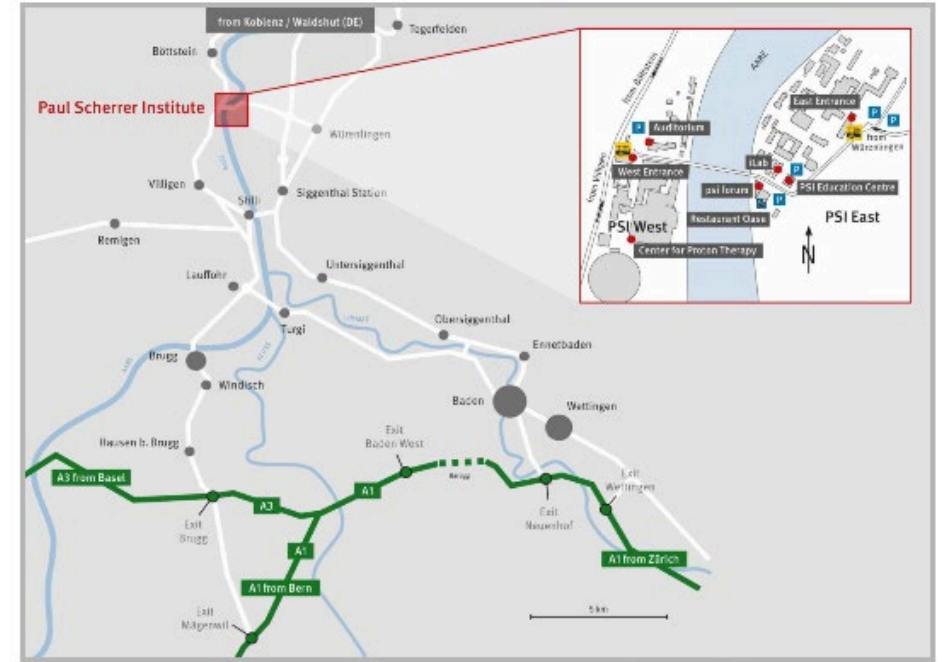
- Gas gain measurements, efficiency studies, time resolution, ecc
- Flux starts from few kHz/cm² and beam spot of 1-2 cm² (in the focusing point)



Space performances are limited by multiple scattering (π are mip)

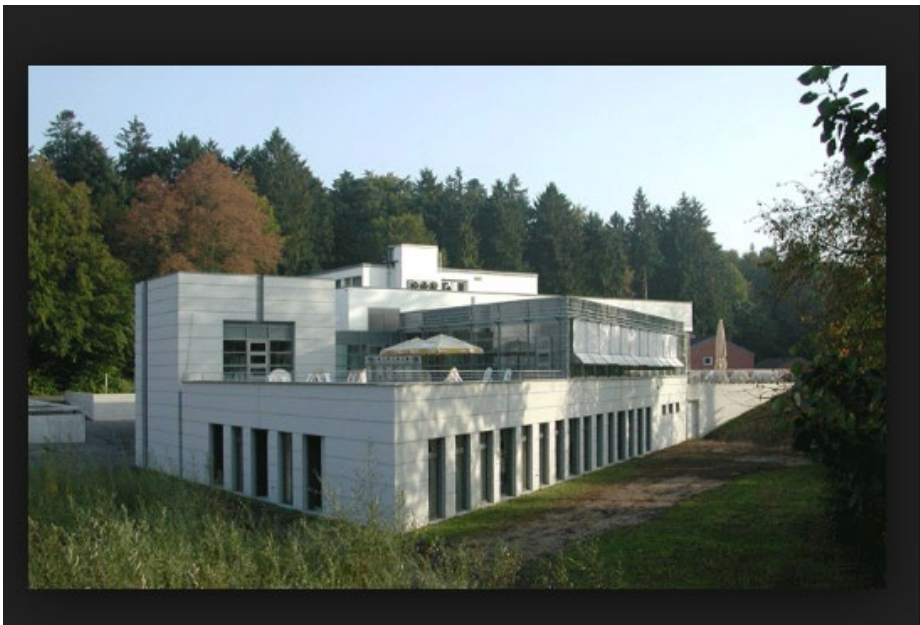
The Paul Scherrer Institute

- PSI is located in northern Switzerland, approximately midway between Zürich and Basel. The nearest towns and railway stations are Baden and Brugg. Frequent flight and train connections via Zürich or Basel are available from all major European cities.
- Please register any visit prior to arrival via PSI's [Digital User Office \(DUO-
https://www.psi.ch/useroffice/duo-help\)](https://www.psi.ch/useroffice/duo-help). This is mandatory in order to obtain a PSI badge, dosimeter and book the guest-house.



Paul Scherrer Institute

- A Guest-House offers a local and practical accommodation for its visitors, guests and users on site. The Guest House is located in the Western part of the PSI campus and offers 57 single and 8 double rooms.
- A canteen [OASE](#) (500 m far from the entrance) & the cafeteria TIME OUT are available for lunch, snack and dinner.



room category	normal rate (CHF)
single room with washbasin	50,-
single room with bathroom	70,-
double room with washbasin	70,-
double room with bathroom	100,-