Universität Zürich[UZH]

KT2 – Lab Course at PSI
First Information

FS 2018

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Dates

We've reserved the beam line for July 9–22

Each one of you should spend two days at PSI
(meet at PSI entrance at 9h00, finish around 17h00**)**

You will work in teams of two
(together with Alex, Lea and myself**)**

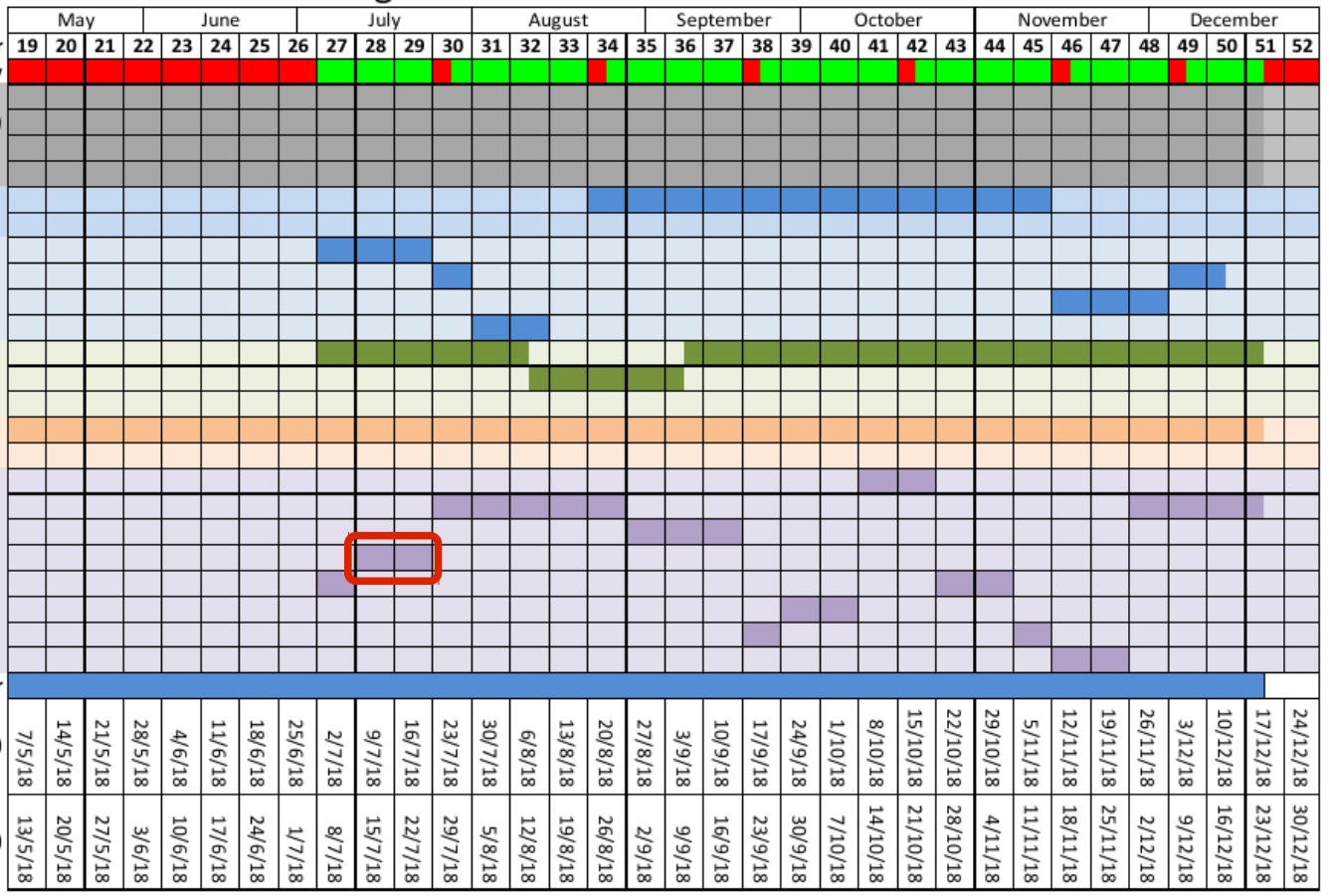
10 participants → 10 consecutive days at PSI
(including weekend(s)**)**

Dates

PSI 590 MeV Program 2018

Last update: Feb 14th, 2018, S. Ritt <stefan.ritt@psi.ch>
http://www.psi.ch/ltp/FacilitiesEN/schedule_2017.pdf

		PSP	
PiM3	MuSR (GPS&LTF)		Amato (coord.)
PiE3	MuSR high field		Scheuermann (coord.)
MuE1	MuSR (GPD)		Amato (coord.)
MuE4	MuSR (LEM)		Prokscha (coord.)
PiE1-1	MuSR (Dolly)		Amato (coord.)
	Muonium	5203.32730.001	Knecht
PiE1-2	R-16-01.1 muX	5203.32730.001	Knecht
	Tests	5203.32730.001	Antognini
	Muonium	5203.85763.010	Soter
	VOXES	5203.85763.010	Scordo
PiE5	R-99-05.2 MEG	5201.32030.001	Mori
	R-12-03.1 Mu3E	5201.32030.002	Schoening
	R-16-02.1 HyperMu	5201.32030.006	Antognini
UCN	R-05-03.1 nEDM		Kirch
PiM1	R-12-03.1 Mu3E	5203.85763.010	Schoening
	R-12-01.2 MUSE	5203.85763.010	Gilman
	Praktikum	5203.85763.010	Grab
	Praktikum	5203.85763.010	Steinkamp
	CMS Diamond Detectors	5203.85763.010	Hits
	Micro Rwell	5203.85763.010	Bencivenni
	Tracking Calorimeter	5203.85763.010	Losekamm
	Irradiation	5203.85763.010	Hajdas



Goal (1)

Measure decays of charged pions

$$\pi^+ \rightarrow \mu^+ \nu_\mu$$

$$\mu^+ \rightarrow e^+ \nu_e \bar{\nu}_\mu$$

- **Stop π^+ in a scintillator**
- **Measure e^+ in an electromagnetic calorimeter**
- **Measure decay-time spectrum and determine π^+ and μ^+ lifetimes**

Goal (2)

Also:

$$\pi^+ \rightarrow e^+ \nu_e$$

- **Measure e^+ energy spectrum and try to estimate the ratio of branching fractions for the two decay modes**

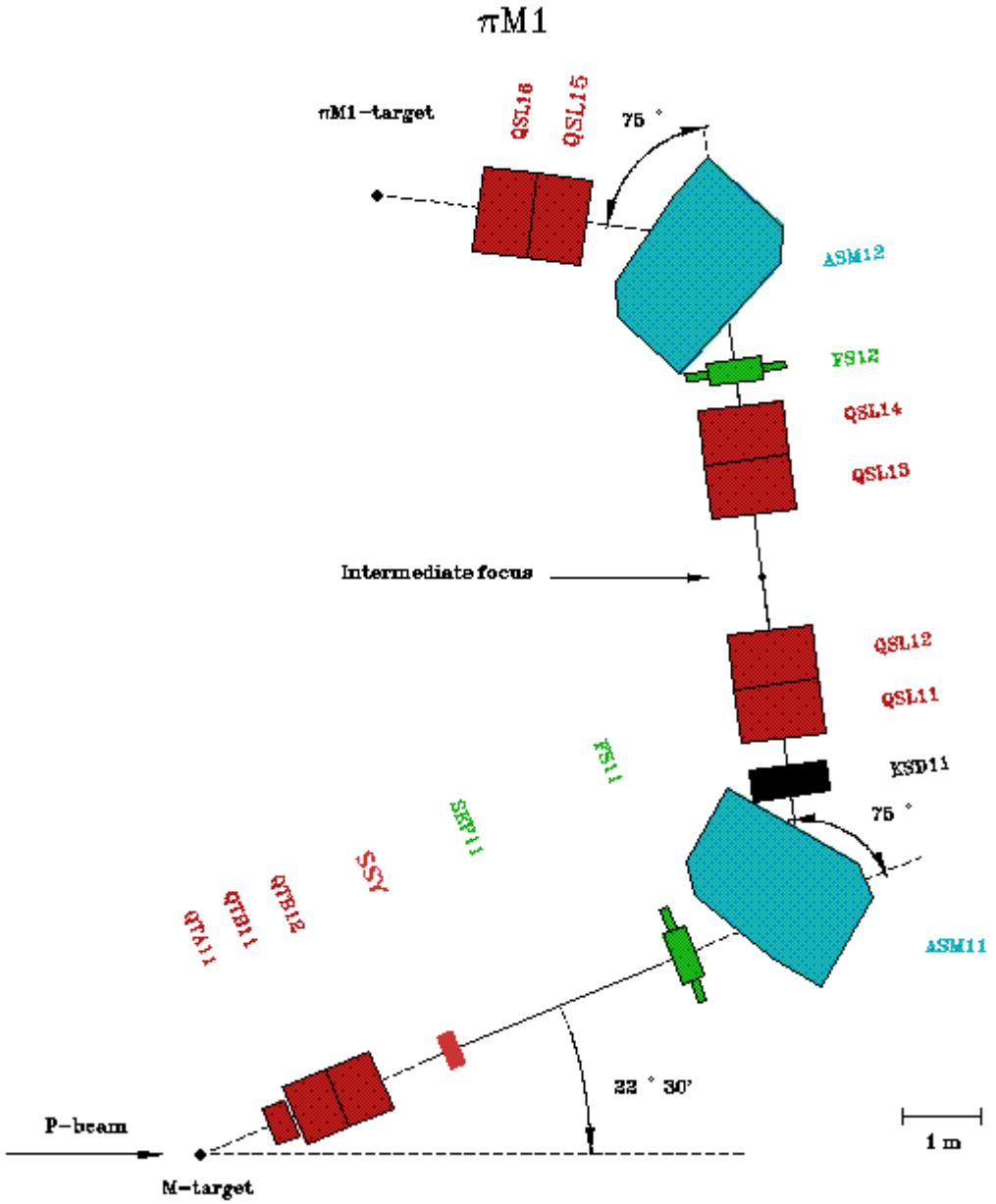
Programme at PSI

"Secondary" beam at πM1:
mix of π^+, μ^+, e^+, p

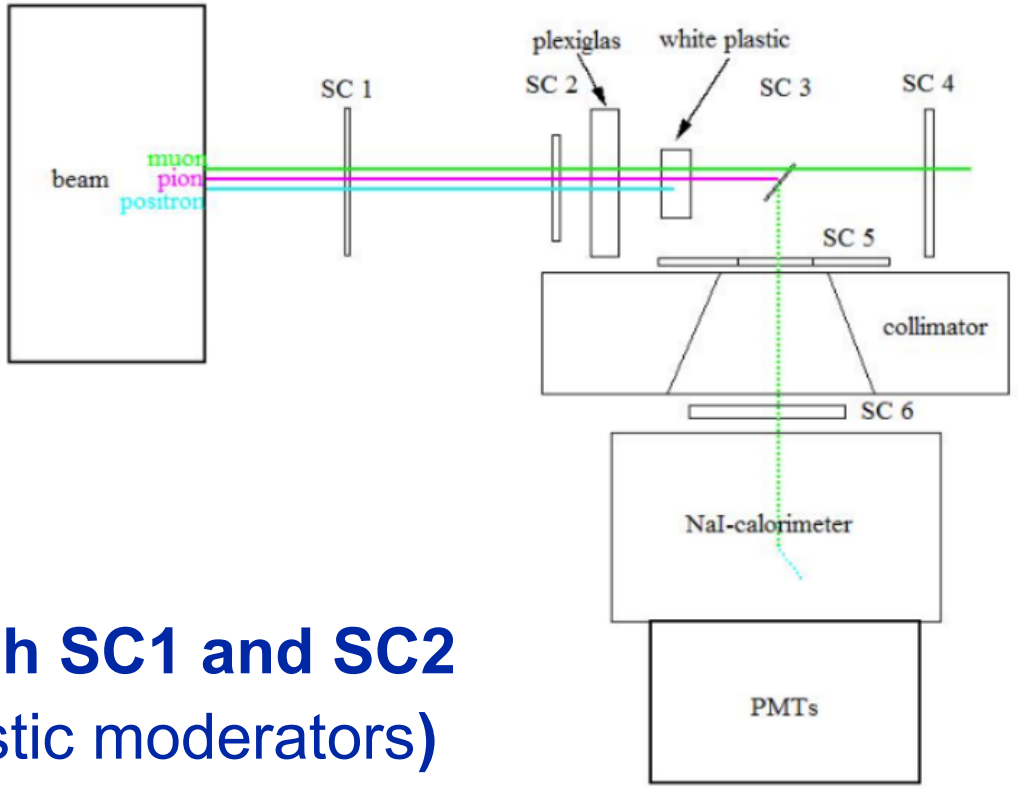
Momentum range
150 – 450 MeV/c

Steering, focussing, momentum adjustable through magnet currents

Beam intensity adjustable through collimator settings



Programme at PSI

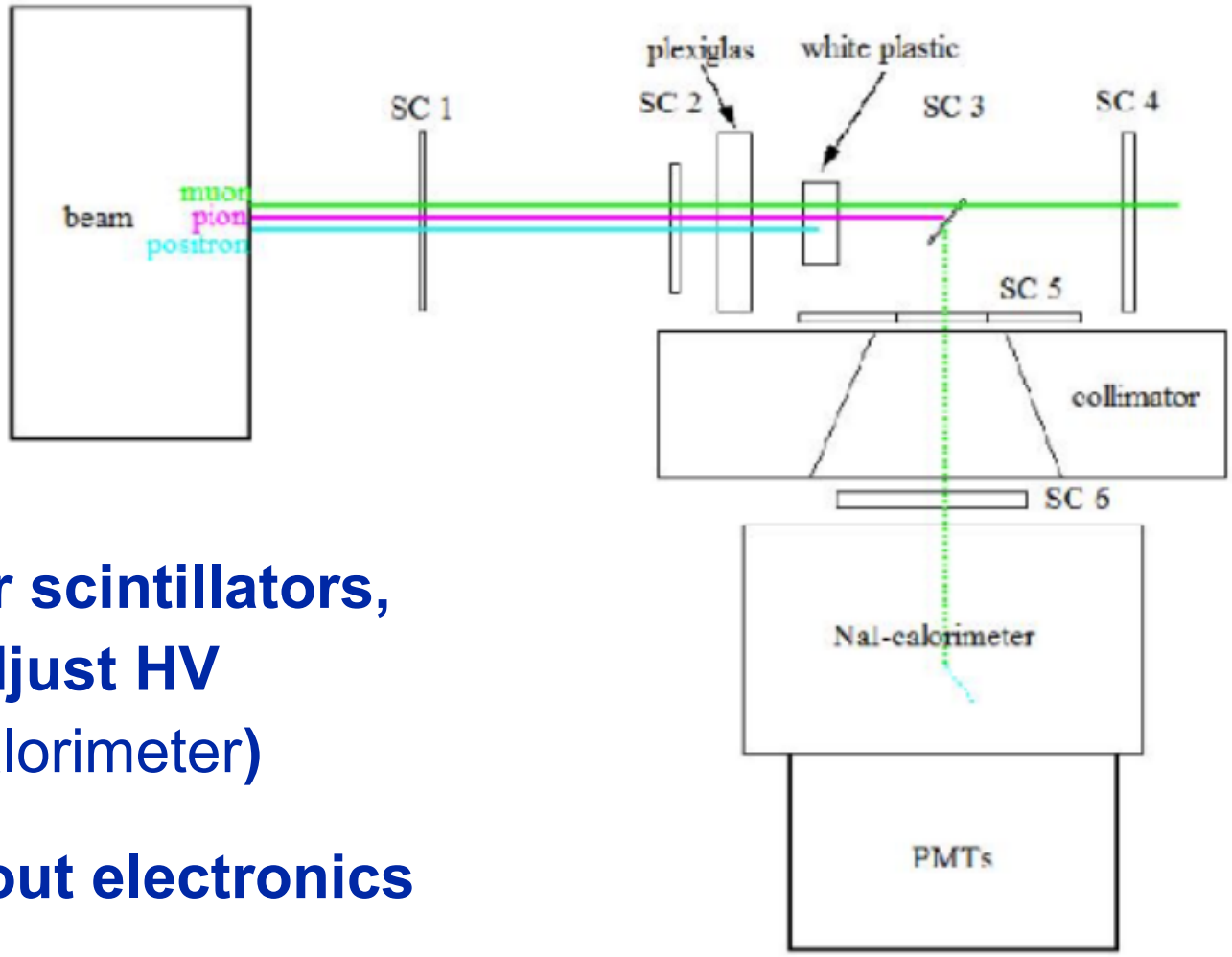


Beam particles pass through SC1 and SC2
(and are slowed down in plastic moderators)

Pions are stopped and decay in scintillator SC3
(SC4 is a veto counter)

Positrons are detected in SC6 (for time) and Calorimeter (for energy)
(SC5 is a veto counter)

Programme at PSI



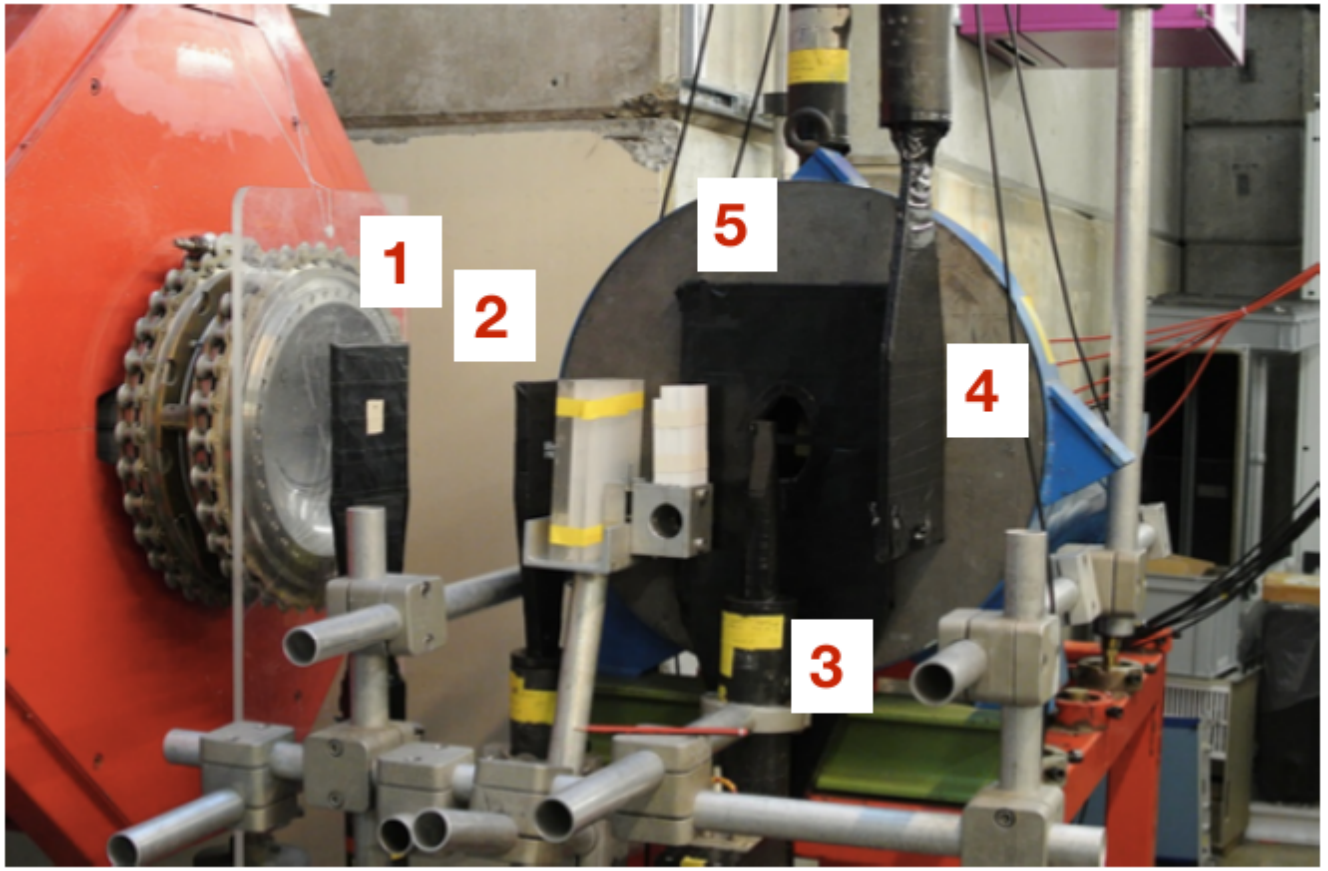
Mount and align trigger scintillators, test PMTs and adjust HV
(scintillators and calorimeter)

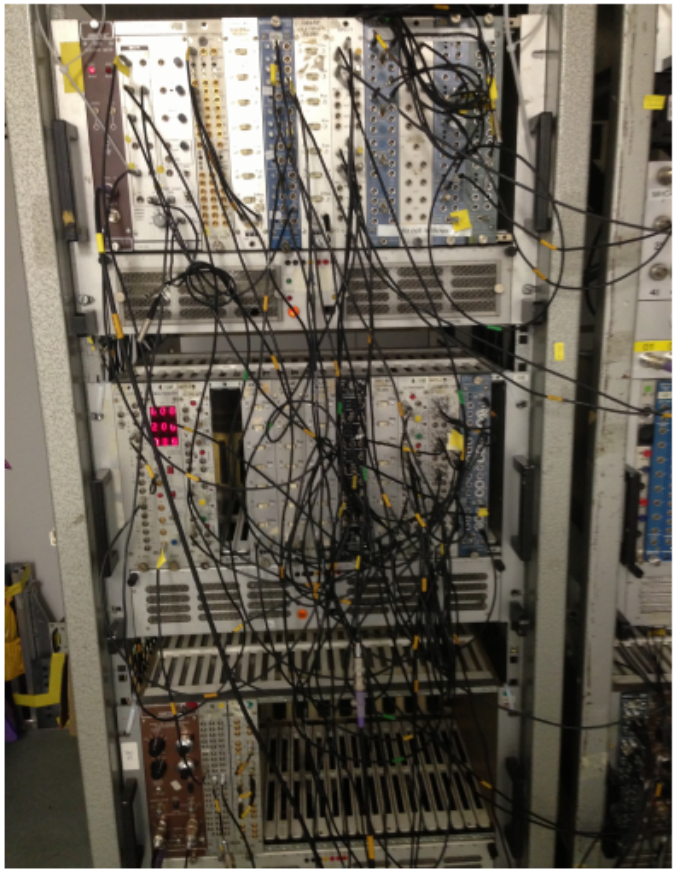
Set up trigger and readout electronics

Optimize beam parameters
(direction and momentum)

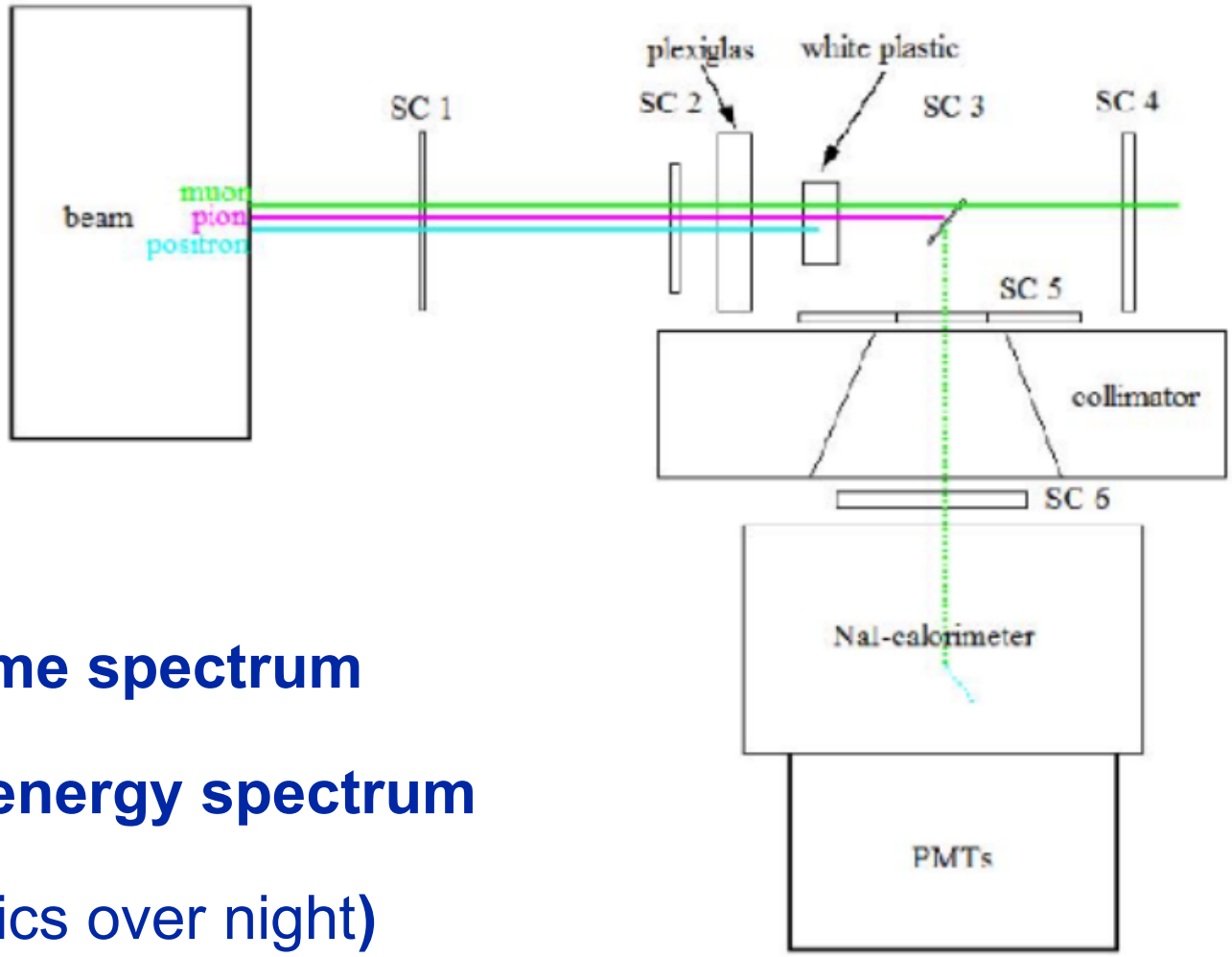
Programme at PSI

Programme at PSI





Programme at PSI



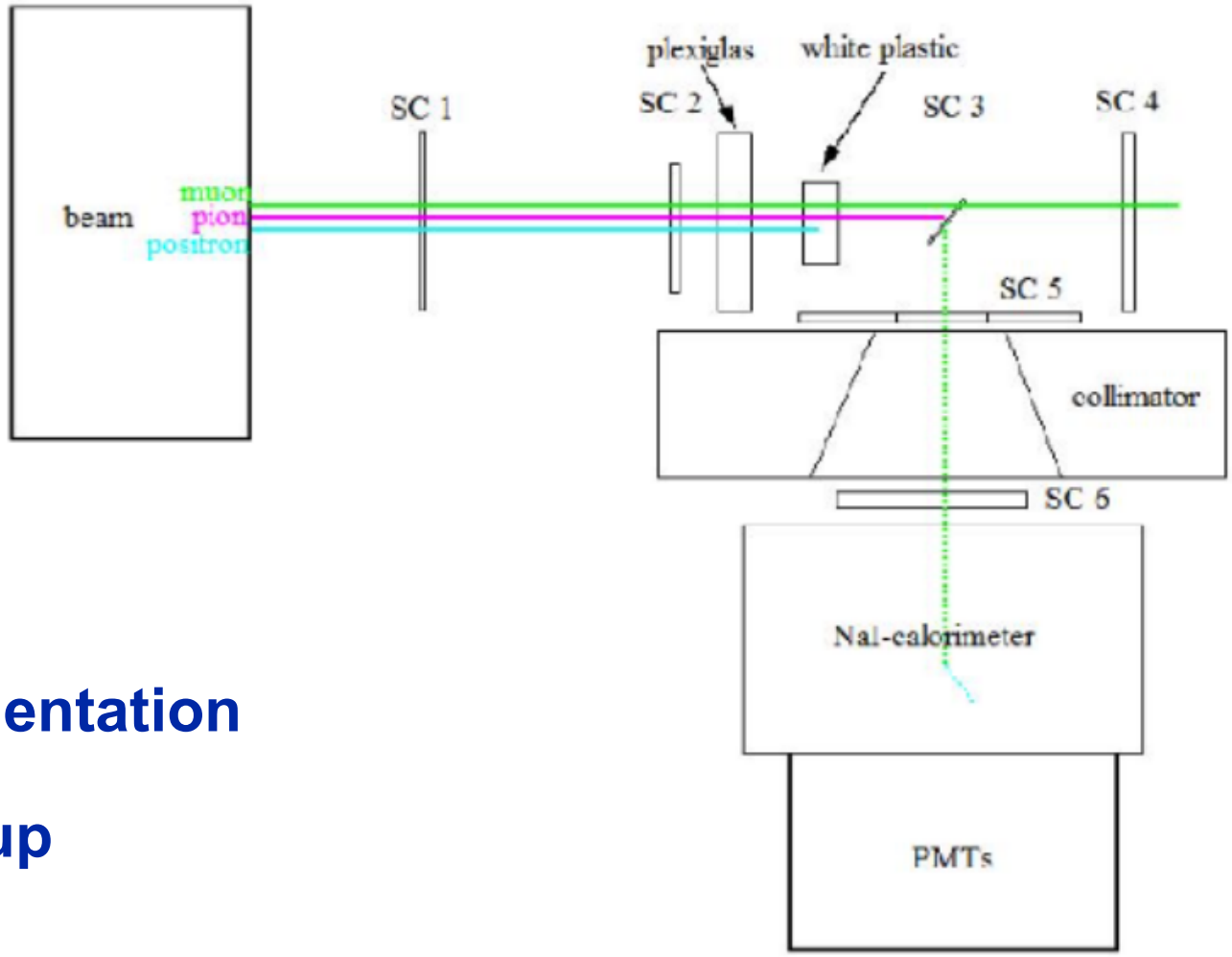
Measure decay-time spectrum

Measure calorimeter energy spectrum

(both: collect statistics over night)

Measure time calibration spectra

Programme at PSI



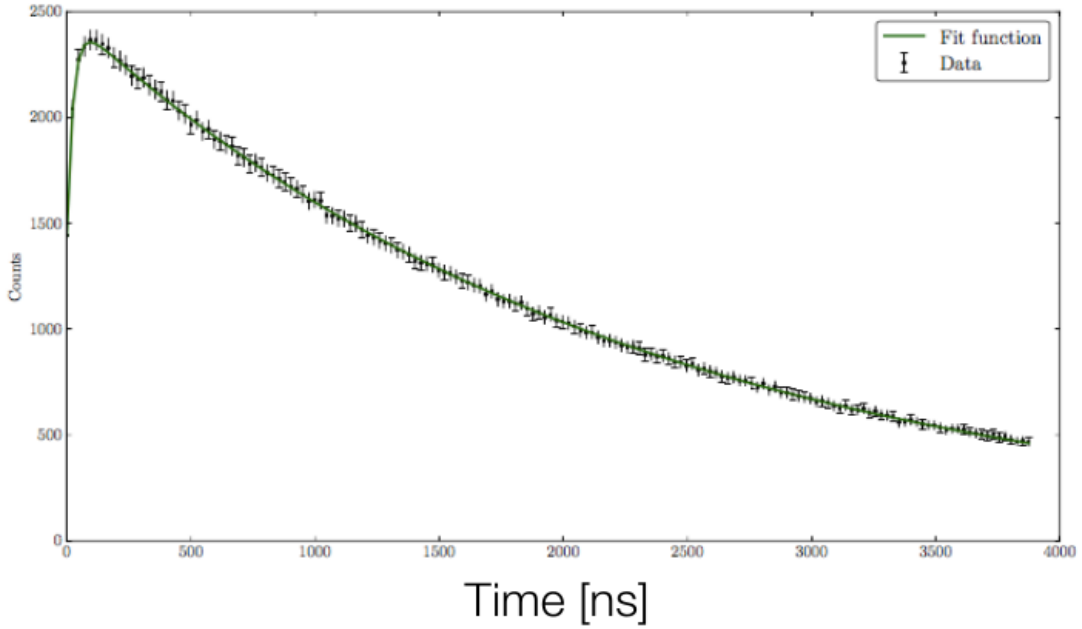
Finish documentation

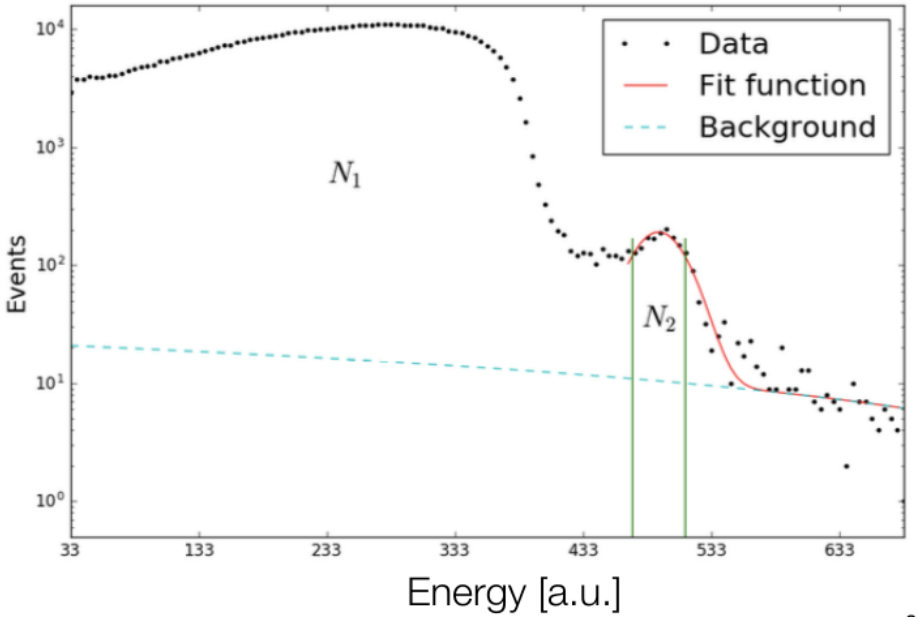
Clean up

After PSI

You'll analyse the data together and write one report

(the deadline for submitting your report is beginning of September)





Organisation

Decide who wants to come to PSI on which days

- Ideally, each one of you should spend
  - one day setting up or cleaning up
  - one day doing “measurements”
- Programme might shift due to problems with equipment or PSI beam

We can do this “now”
or towards the end of the semester
(your choice**)**

Organisation

Decide how you want to communicate with each other, pass information from one team to the others during the measurements

- LOGBOOK (paper or electronic) !!!
- Group chat ?
- Daily run meeting with Video conferencing ?

Organisation

Each one of you will need a personal PSI dosimeter

Alex will send you an email with detailed instructions

Organisation

Questions?

olafs@physik.uzh.ch

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36-J-05