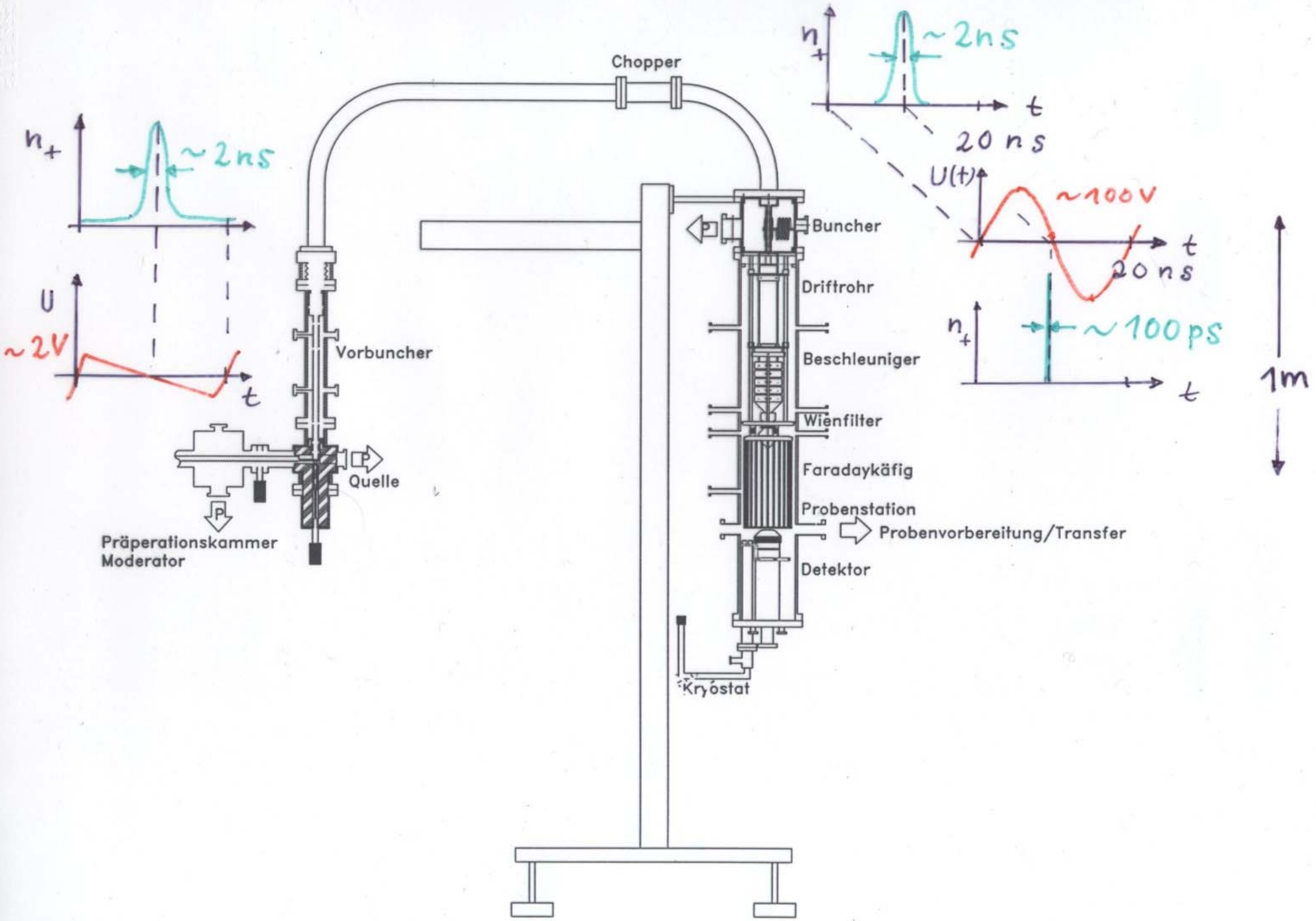

Chopper
n_+
~2ns
t
20 ns
U(t)
~100V
~100ps
U
~2V
Vorbuncher
Buncher
Driftrohr
Beschleuniger
Wienfilter
Faradaykäfig
Probenstation
Probenvorbereitung/Transfer
Detektor
Kryostat
Quelle
Präperationskammer
Moderator
1m

Background and satellite peaks in time spectra from pulsed beams

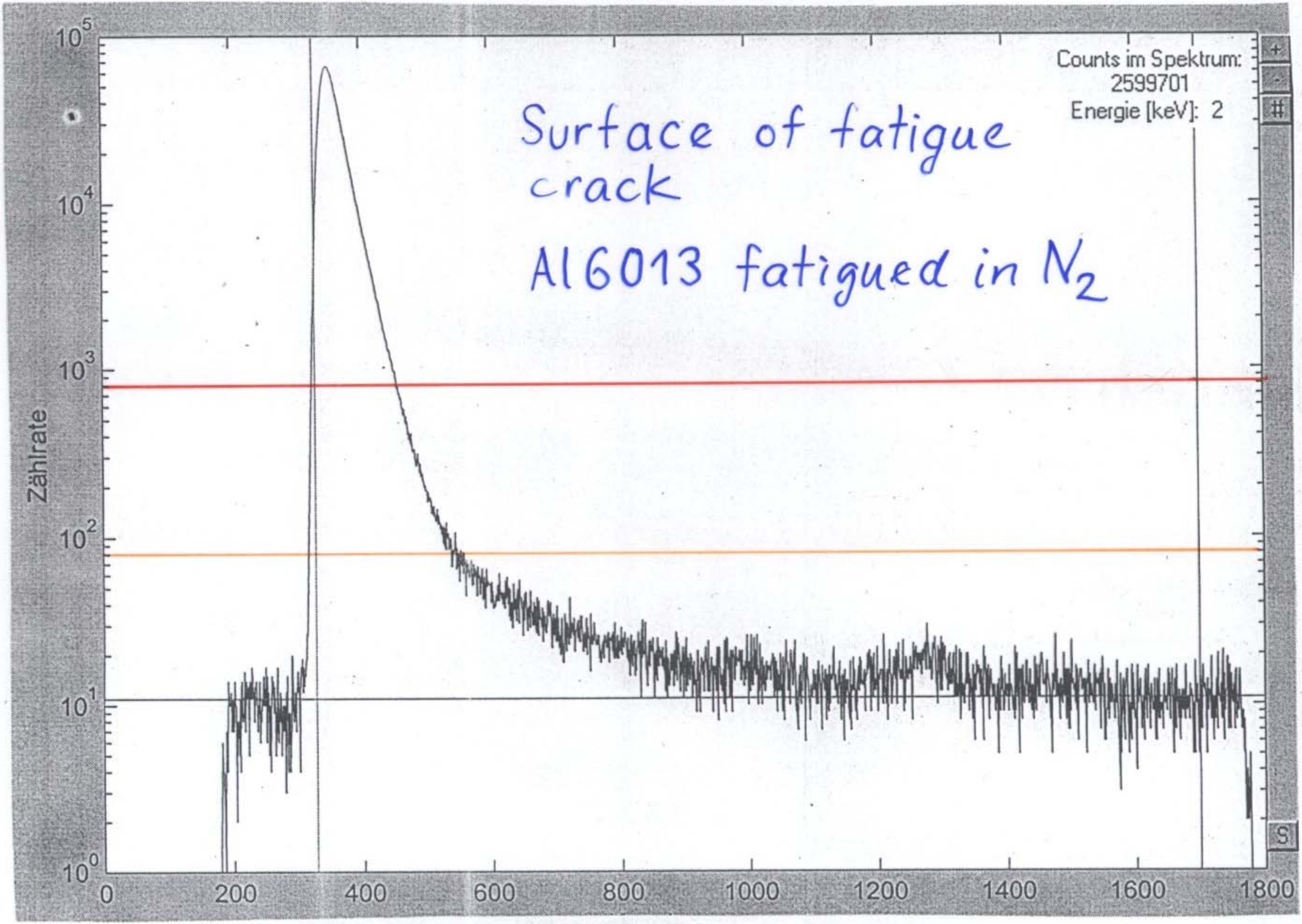
Evaluation of lifetimes and intensities

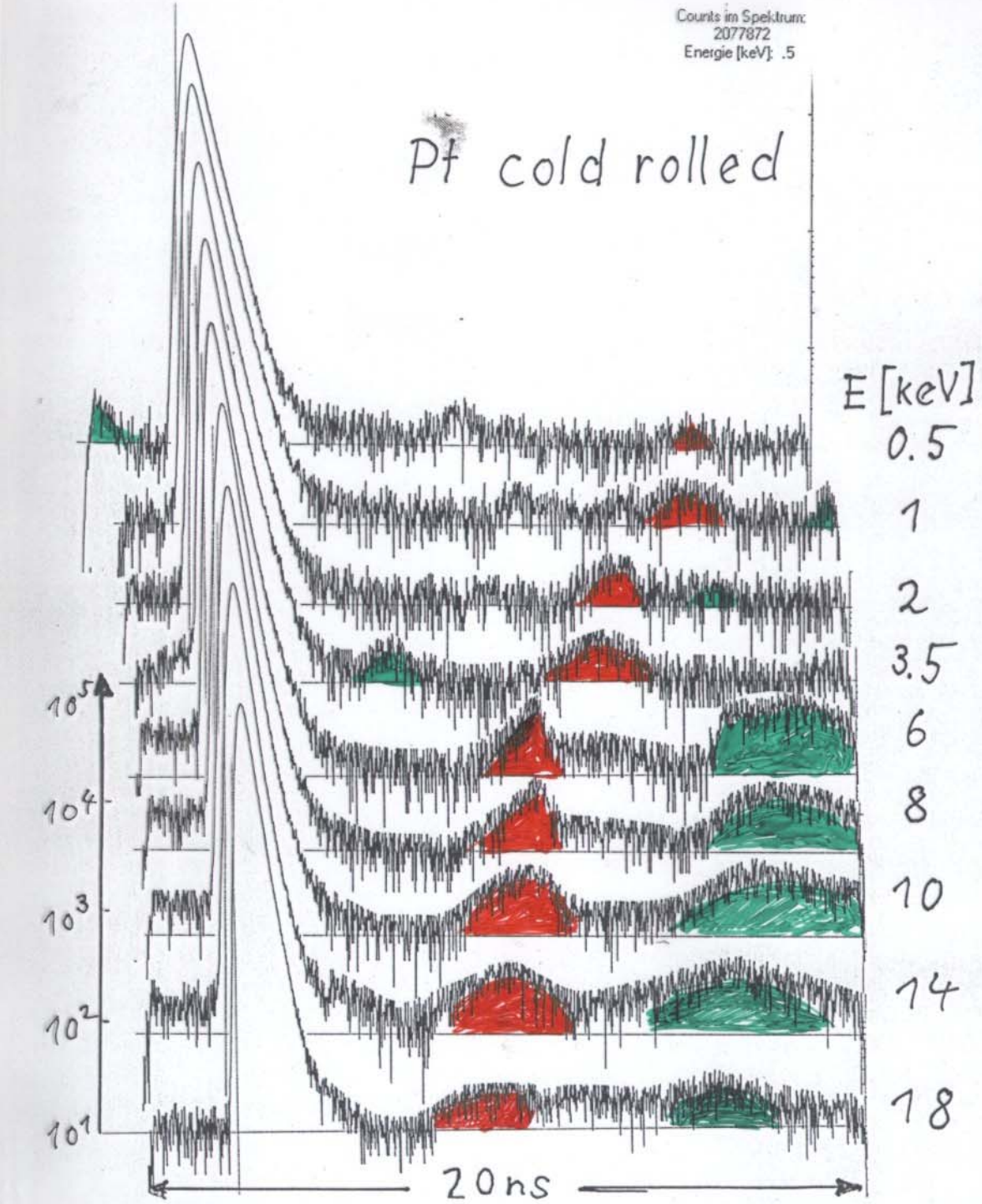
ill-posed problem ⇝ extremly sensitive to small errors in the model ⇝

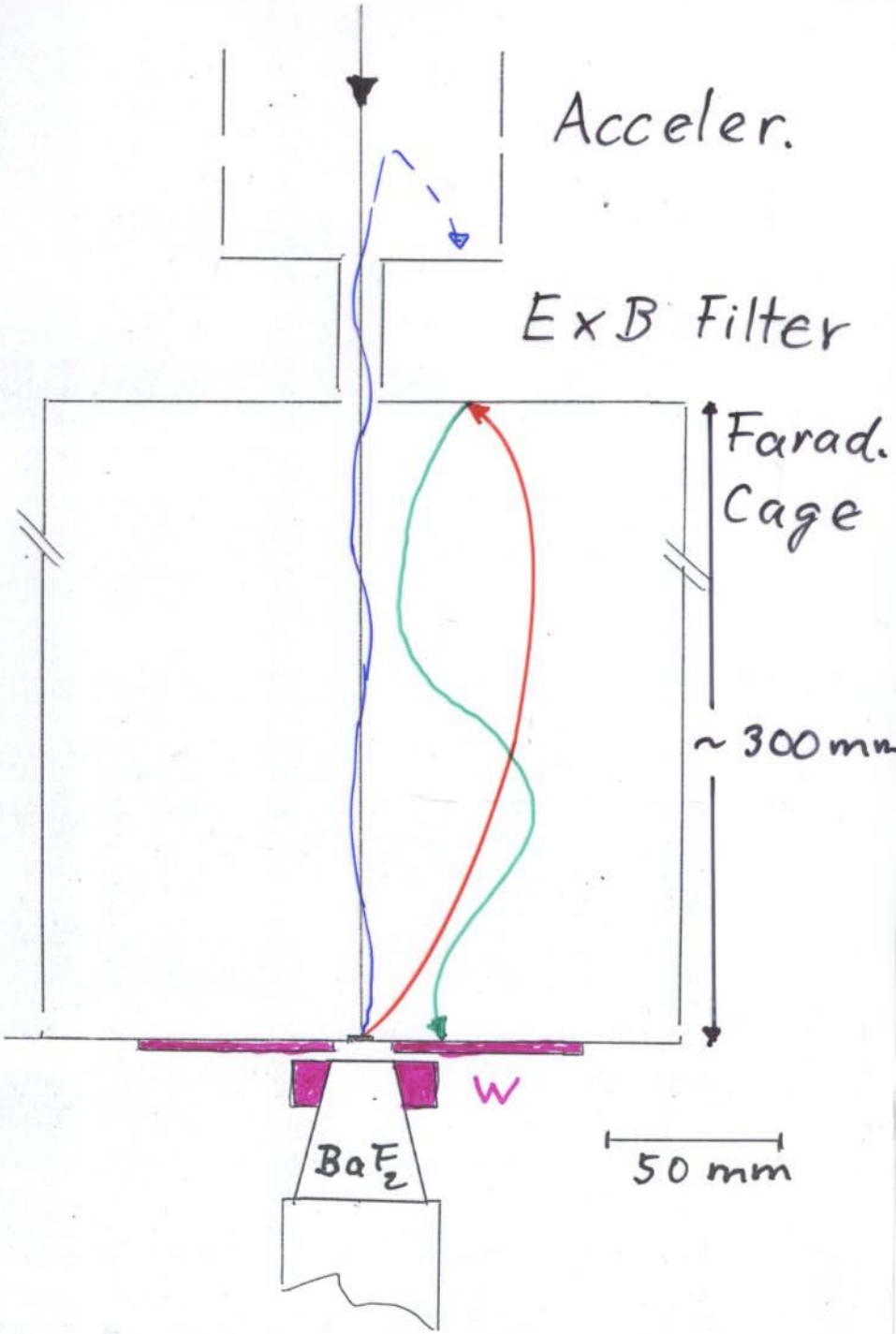
For reliable results not only good time resolution and high event numbers, but also a low background required.

⇝ time structure

Source of background	const.	peaks
Cosmic + terrestrial radiation	+	
Annihil. at source and beam line	+	+
Background between e^+-pulses	+	
Trailing edge of e^+-pulses		+
Positron reflection at target	+	++
Measurements in sandwich arrangement: chance coincidences	+	


Surface of fatigue crack
Al6013 fatigued in N_2
Counts im Spektrum:
2599701
Energie [keV]: 2
Zählrate
10^5
10^4
10^3
10^2
10^1
10^0
0
200
400
600
800
1000
1200
1400
1600
1800

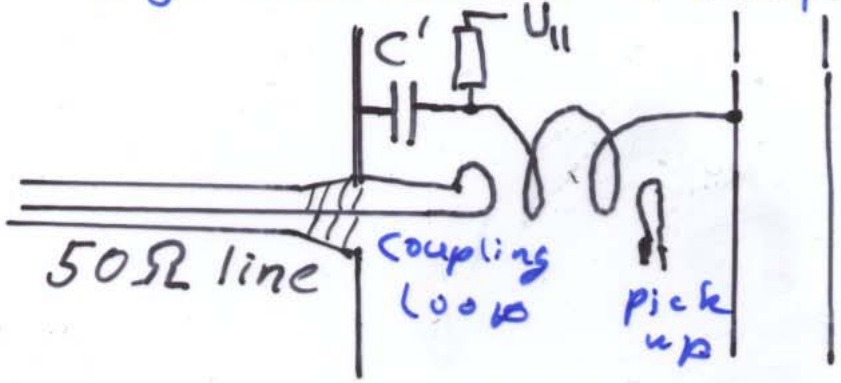

Counts im Spektrum:
2077872
Energie [keV]: .5
Pt cold rolled
E [keV]
0.5
1
2
3.5
6
8
10
14
18
10^5
10^4
10^3
10^2
10^1
20 ns


Acceler.
ExB Filter
Farad.
Cage
~ 300 mm
W
BaF_2
50 mm

RF-techniques as applied by the Munich group

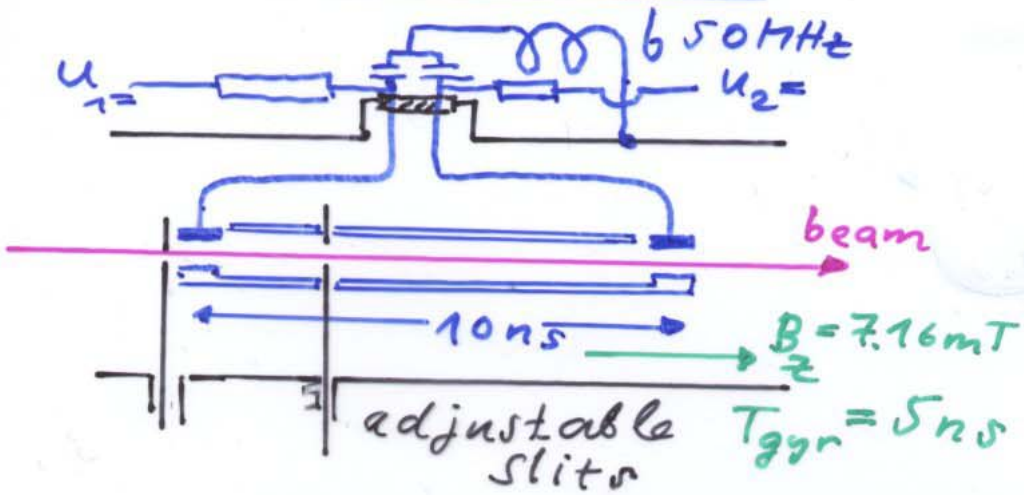
1. Pure sine-wave whenever possible

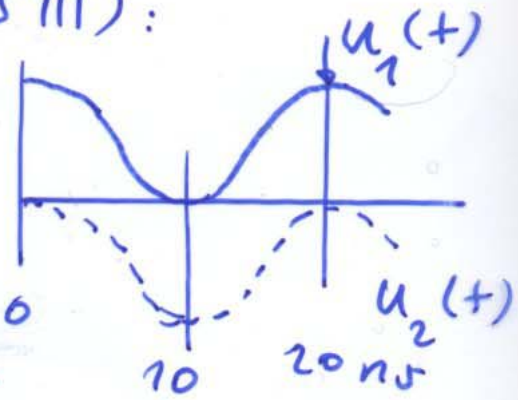
Common master oszill. → narrow band amplifiers, phase- and amplitude-controlled (Fa. Hegewiesch, about 2k€ for 1 W output) enables up to 1kV rf-amplitude by resonance transformation:



Appropriate tuning of input by alteration of coupling loop until reflexion is minimal and pick-up voltage at maximum.

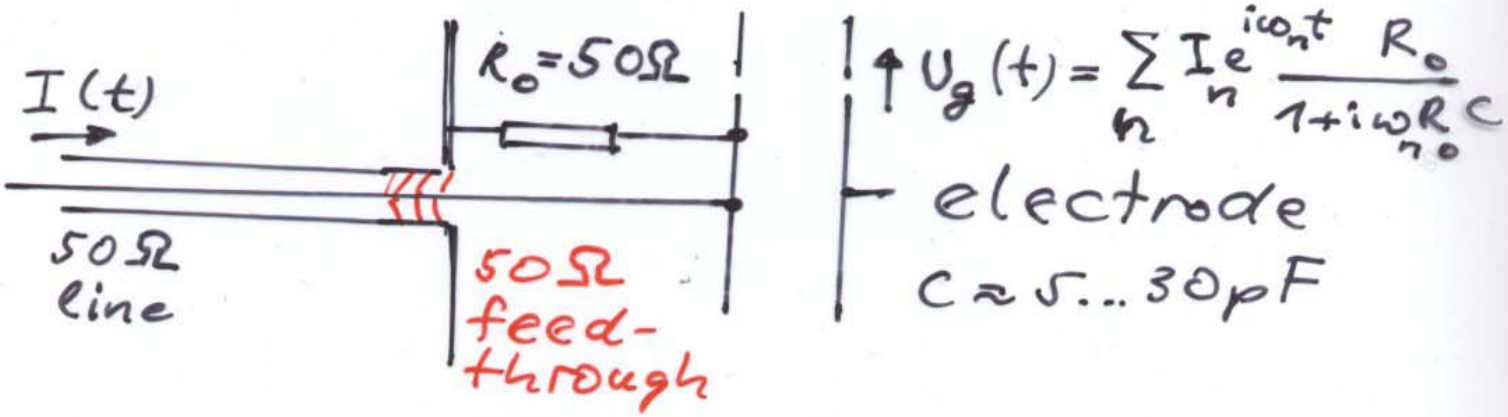
Sine wave chopper (PLEPS III):





$U_1(t) = \hat{U}(1-\cos\omega t)$; $U_2(t) = \hat{U}(-1-\cos\omega t)$

2. If sine-waves were insufficient, avoid superficious band width because of the coupling problems!



I(t) may be measured, but $U_g(t)$ is deformed!

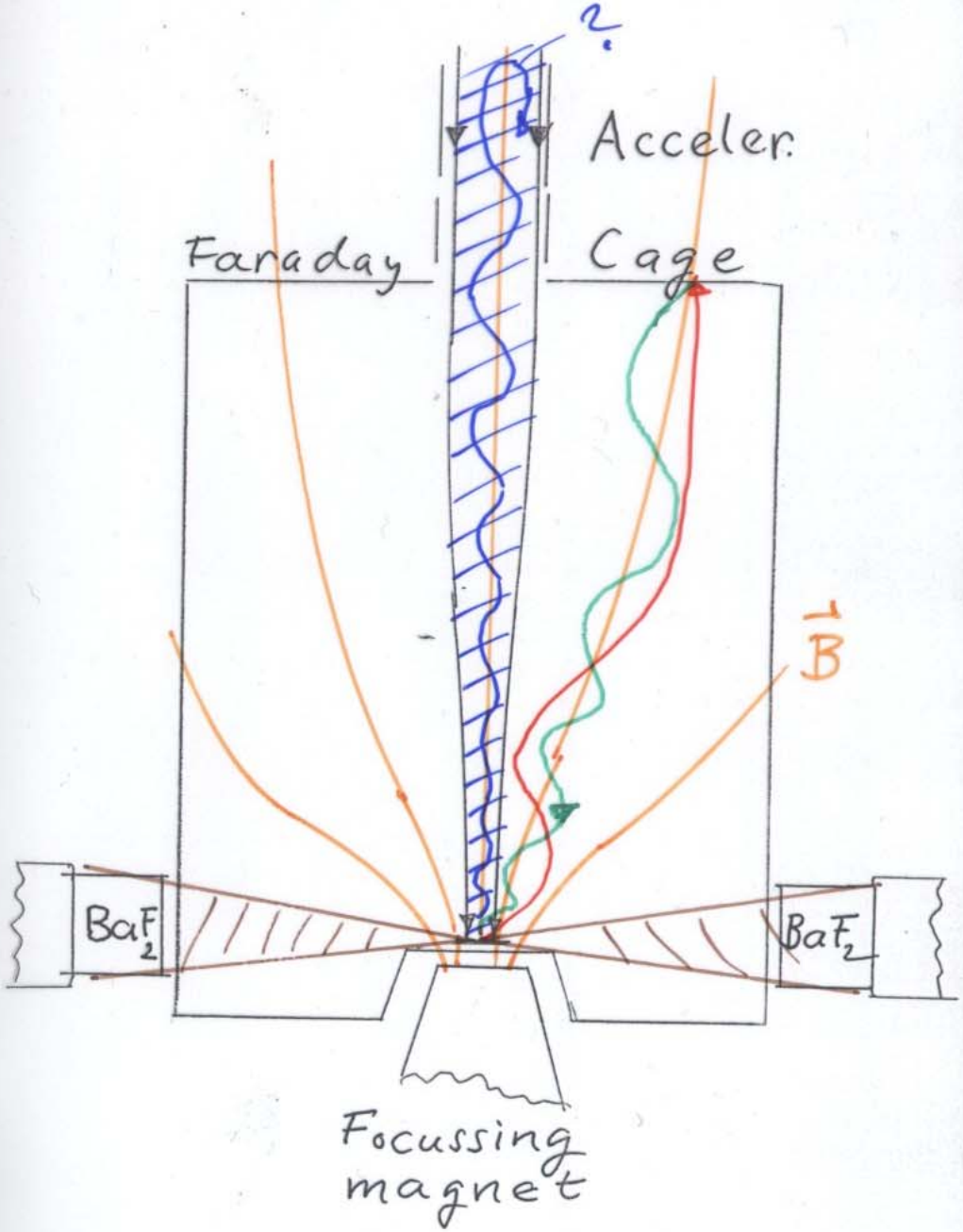
For PLEPS and SPM: $\omega_{max} \approx 300$ MHz

$|U_g| \leq 3$ V

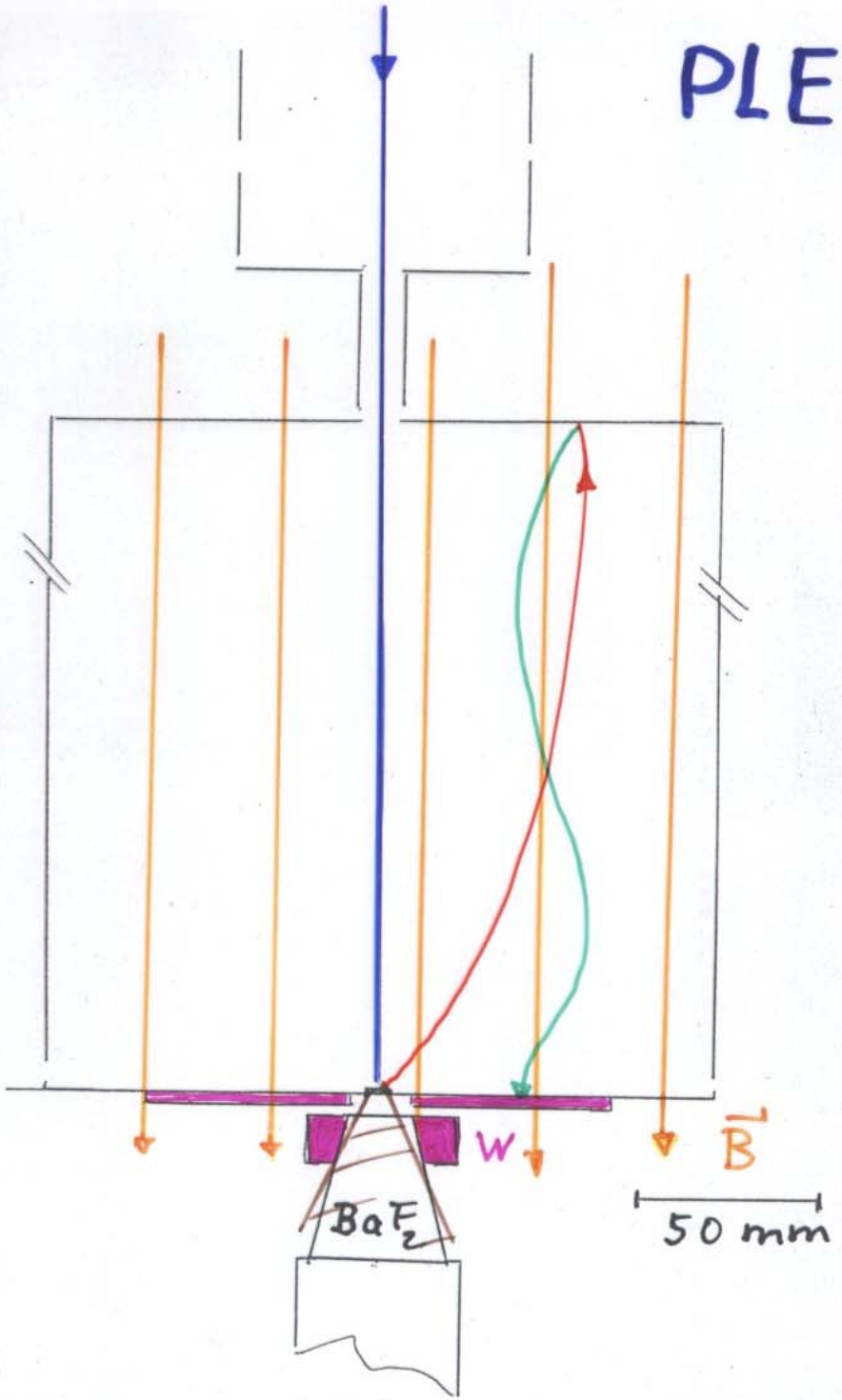
~ modified Nuclear Electronics sufficient for sawtooth generator (SPM, PLEPS) and chopper pulse (SPM).

P. Sperr, P. Willutzki, D. Schödlbauer

EPOS


2.
Acceler.
Faraday
Cage
$\vec{B}$
BaF_2
BaF_2
Focussing
magnet

PLEPS


W
$\vec{B}$
BaF_2
50 mm

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ON THE ELECTRONIC DESIGN AND THE PERFORMANCE OF A RAMP GENERATOR FOR A PULSED LOW ENERGY POSITRON BEAM

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[2] Lawrence Berkeley Laboratory, Berkeley, California 94720, USA

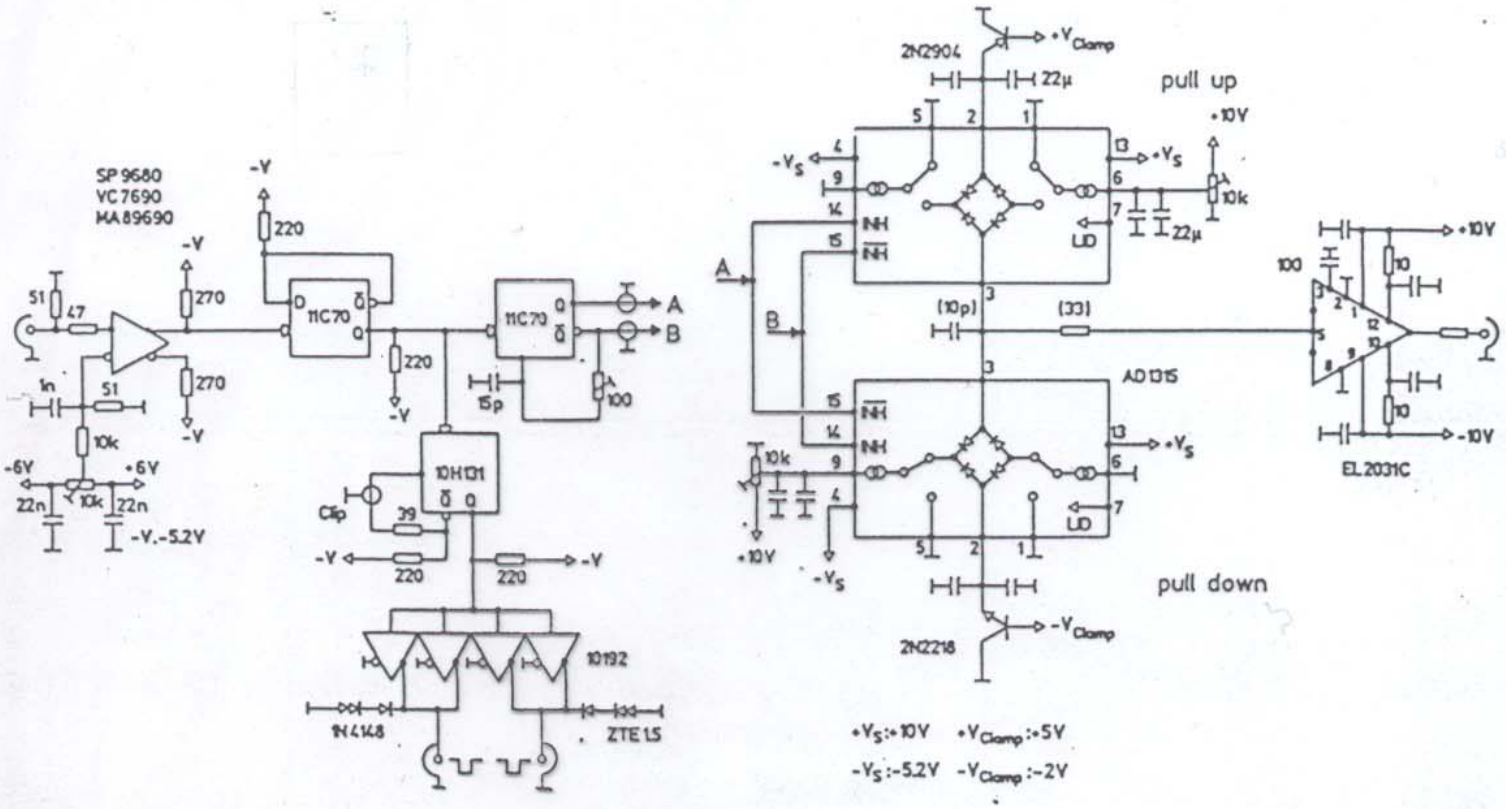
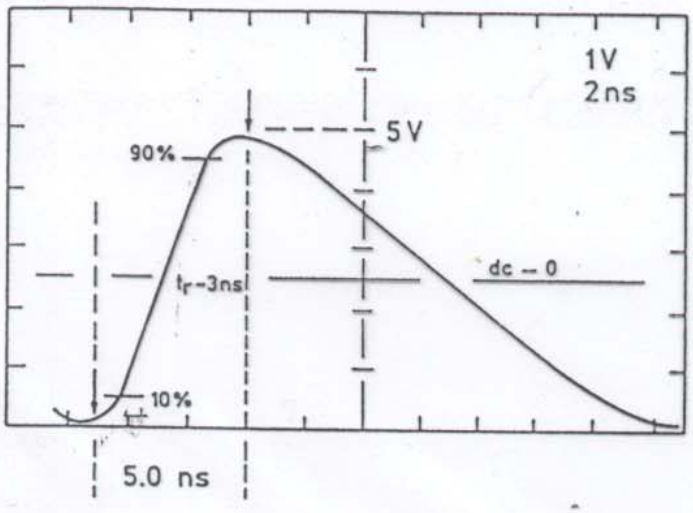
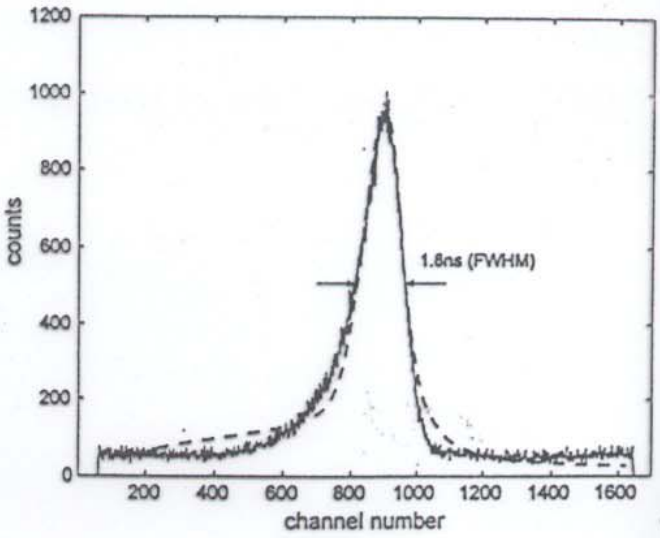


Fig.1: Circuit diagram of the sawtooth generator



sawtooth signal



Positron bunch