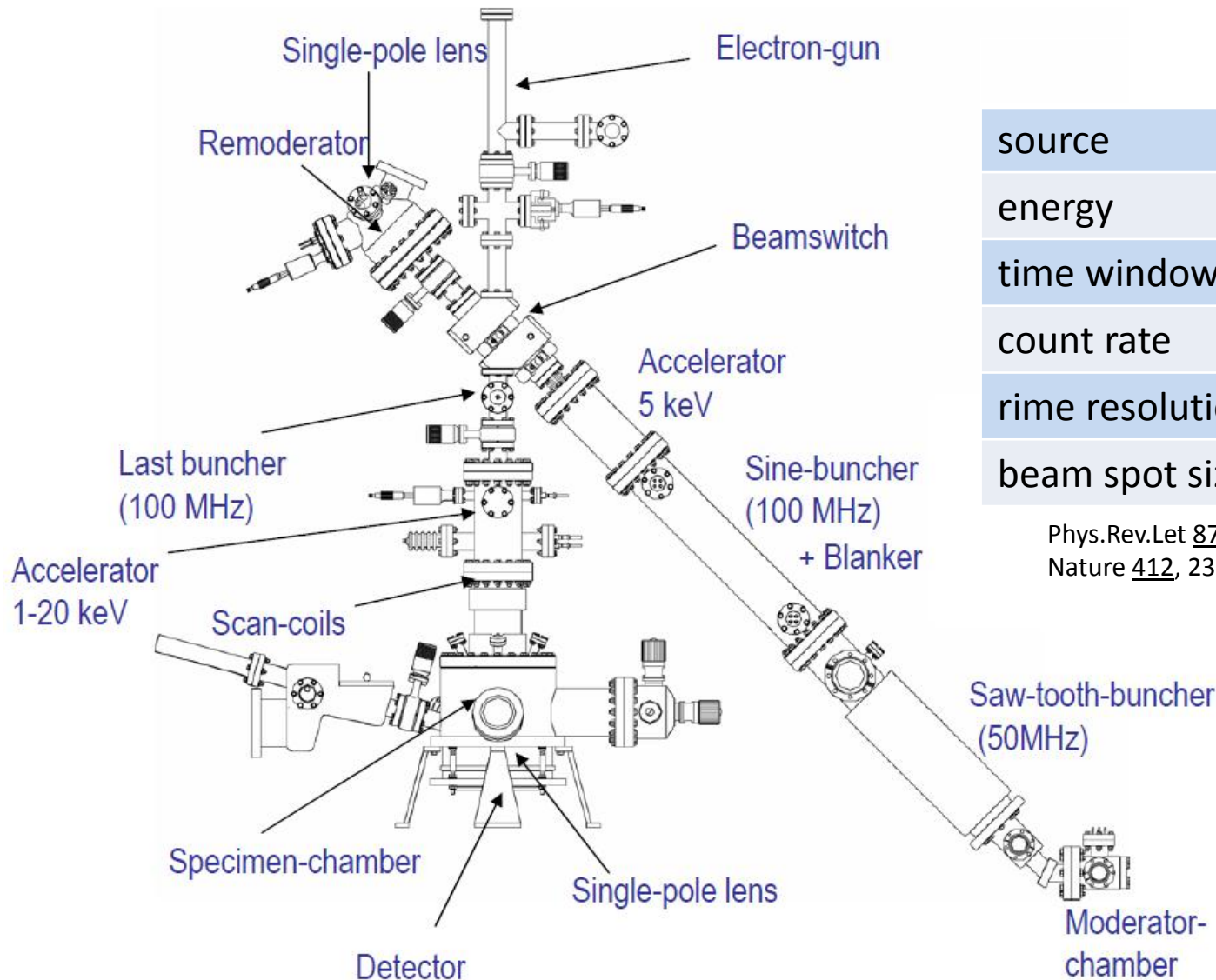


# Implementing the Munich Scanning Positron Microscope at NEPOMUC

Marcel Dickmann



# The Scanning Positron Microscope SPM

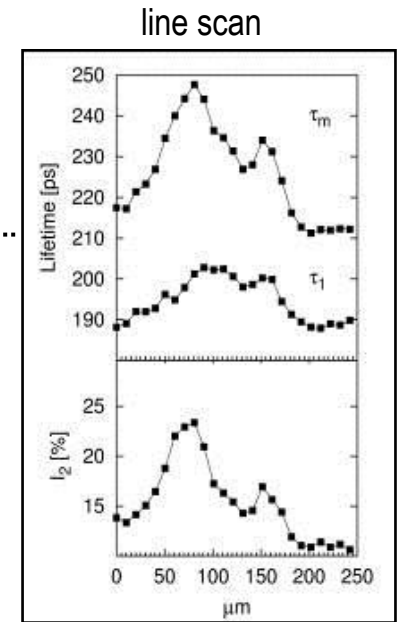
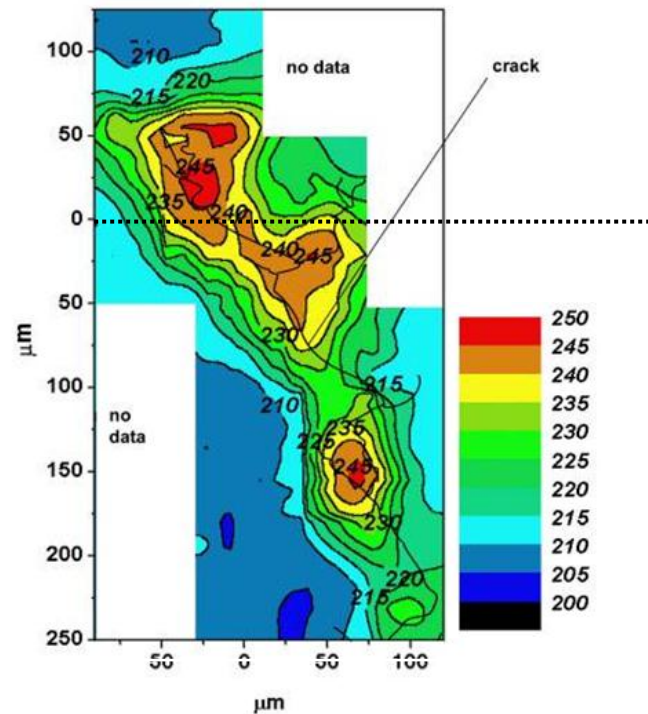
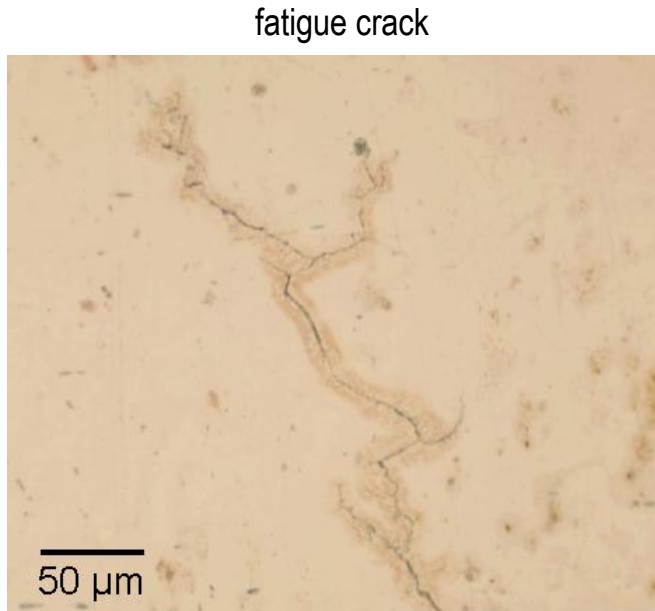


source	< 30 mCi
energy	1- 20 keV
time window	20 ns
count rate	500 1/s
rime resolution	250 ps
beam spot size	> 1 $\mu$ m

Phys.Rev.Let 87, 067402 (2001)

Nature 412, 23 August 2001, 764source

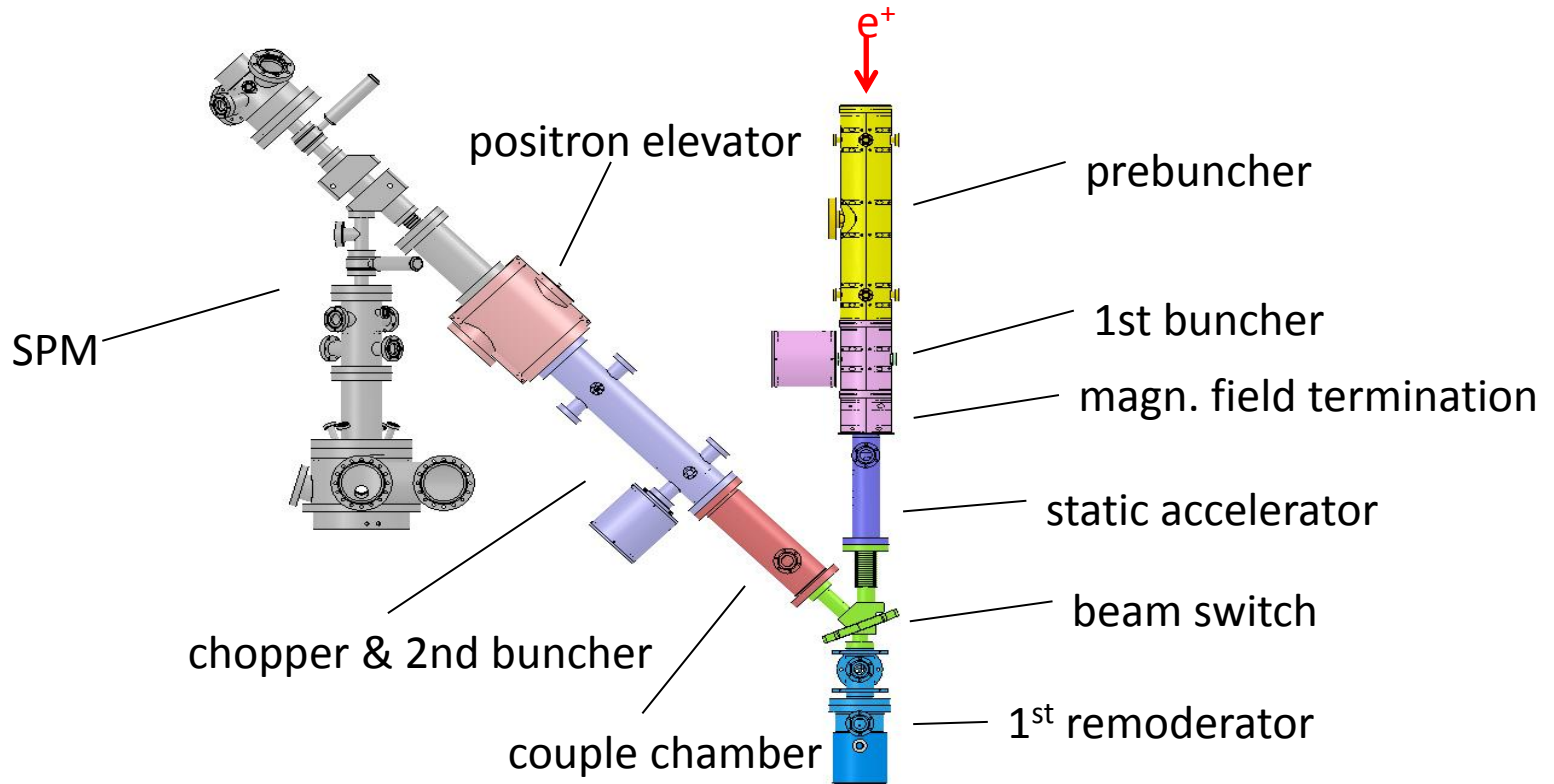
# SPM & Fatigue cracks in technical copper



W. Egger, G. Kögel, P. Sperr, W. Triftshäuser,  
J. Bär, S. Rödling, H.-J. Gudladt  
Applied Surface Science 194 (2002) 214-217

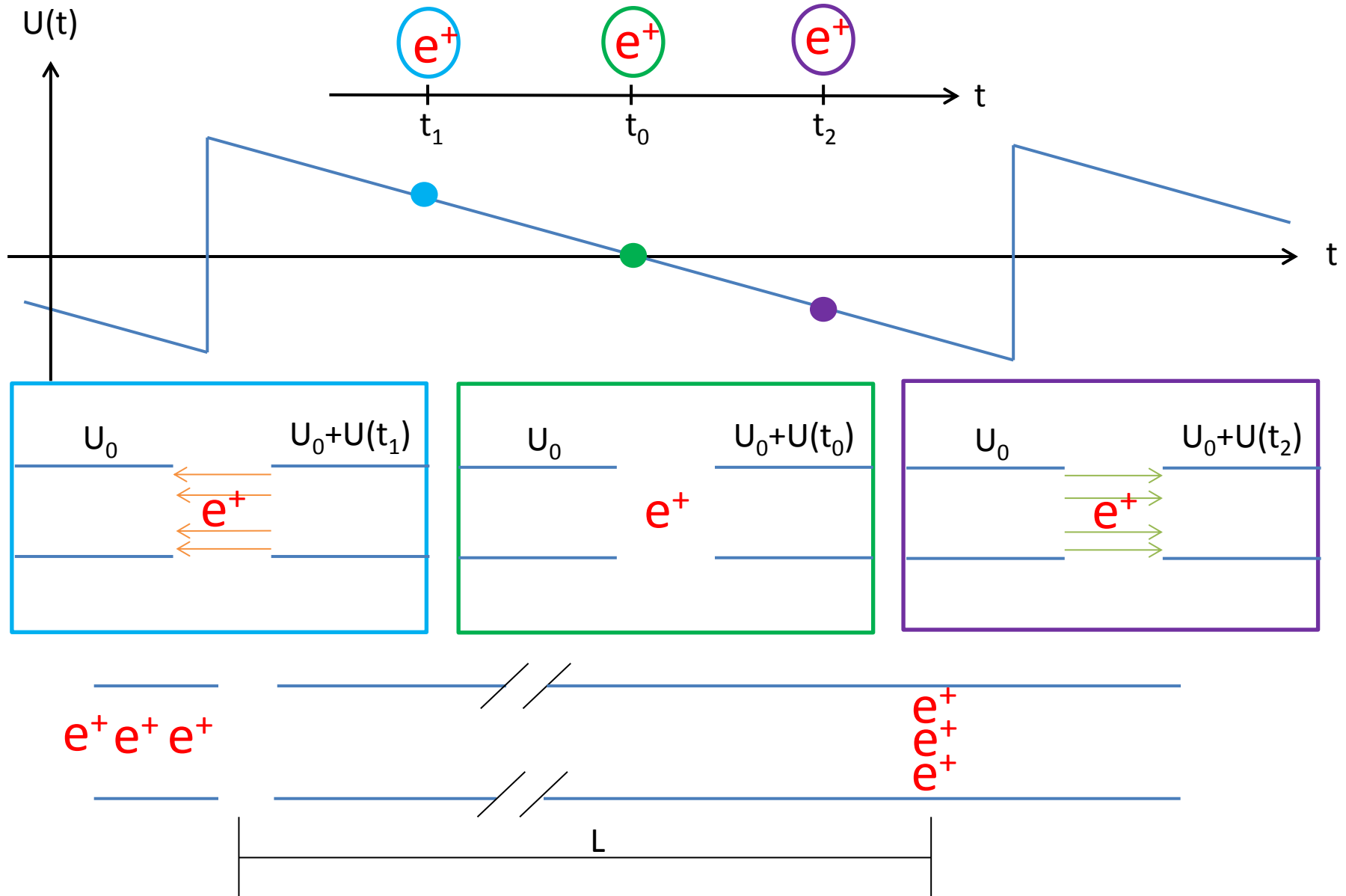
resolution	5 μm
energy	16 keV
step distance	10 μm
number of spectra	600
measurement time per spectrum	900 s
total measurement time	≈ 1 week

# SPM and Interface

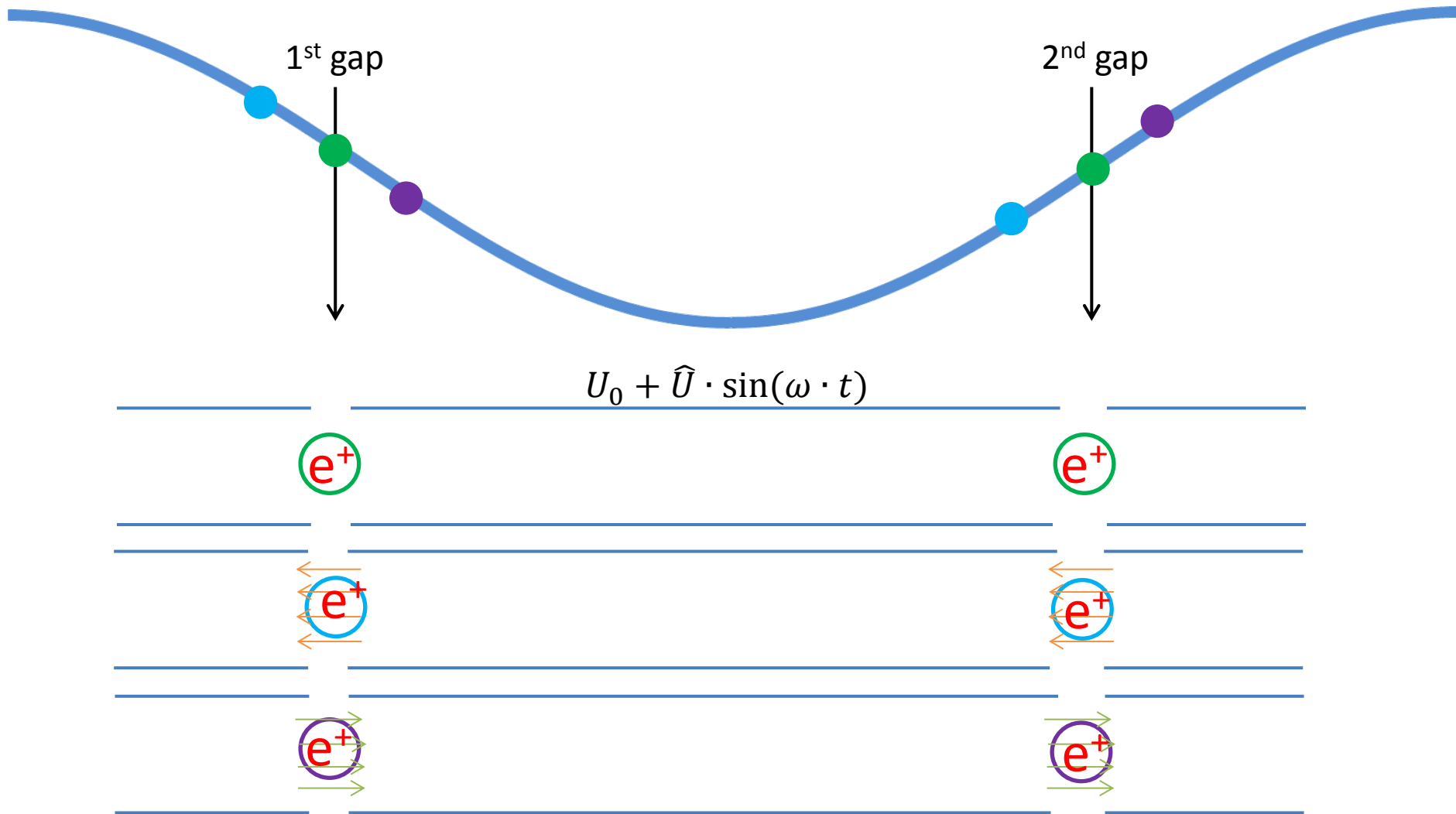


Source	Laboratory	NEPOMUC (remoderated)
$I \left[ \frac{e^+}{s} \right]$	$2 \cdot 10^5$	$3 \cdot 10^7$
$d_{FWHM} [mm]$	3	1,85
$E_{\perp} [eV]$	0,1	0,8
$B = \frac{I}{d^2 E_{\perp}} \left[ \frac{e^+}{mm^2 eV} \right]$	$2,2 \cdot 10^5$	$> 1,1 \cdot 10^7$

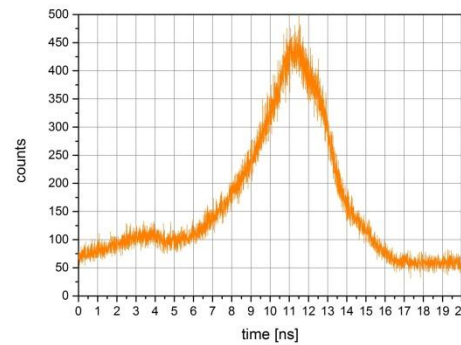
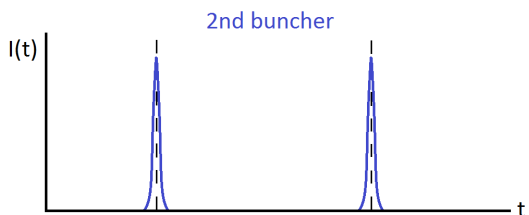
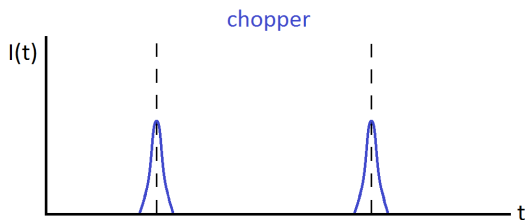
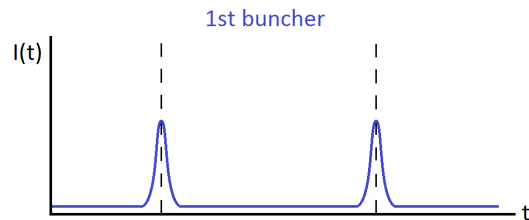
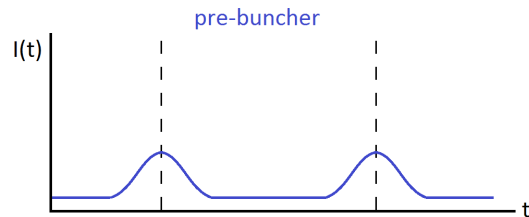
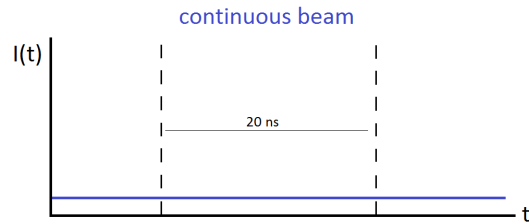
# Saw tooth bunching



# Sine wave bunching

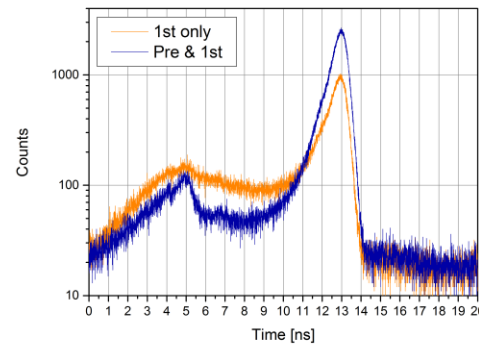


# Bunching & Chopping

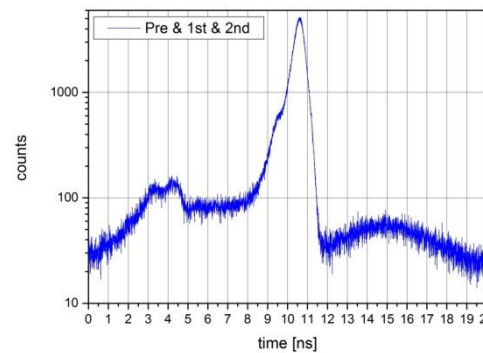


pulse length  
(FWHM)

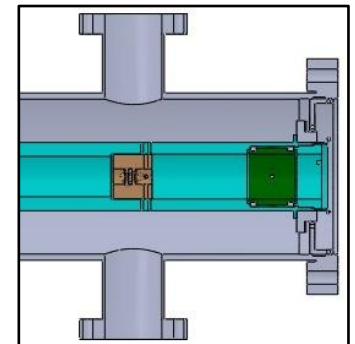
4,8 ns



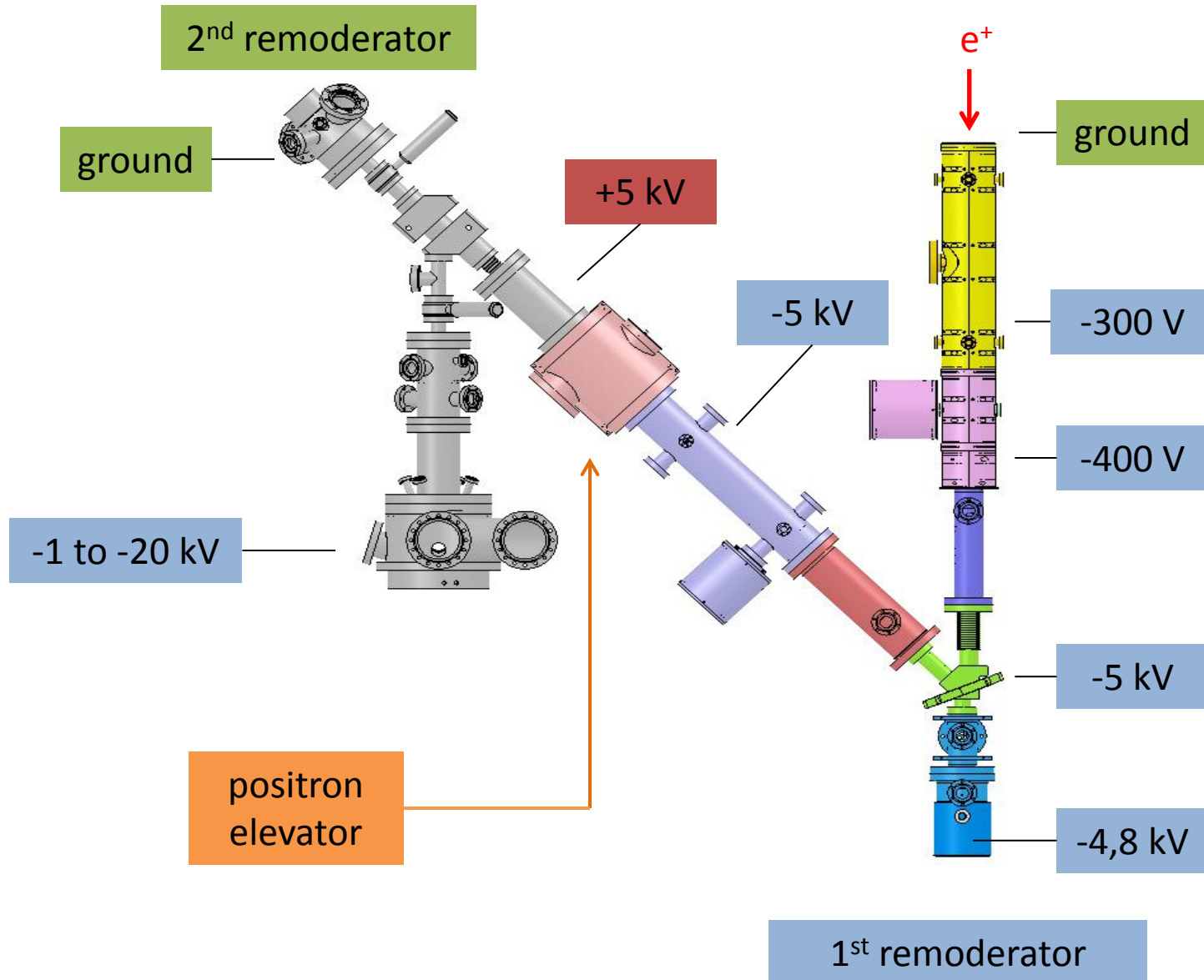
1020 ps  
890 ps



600 ps

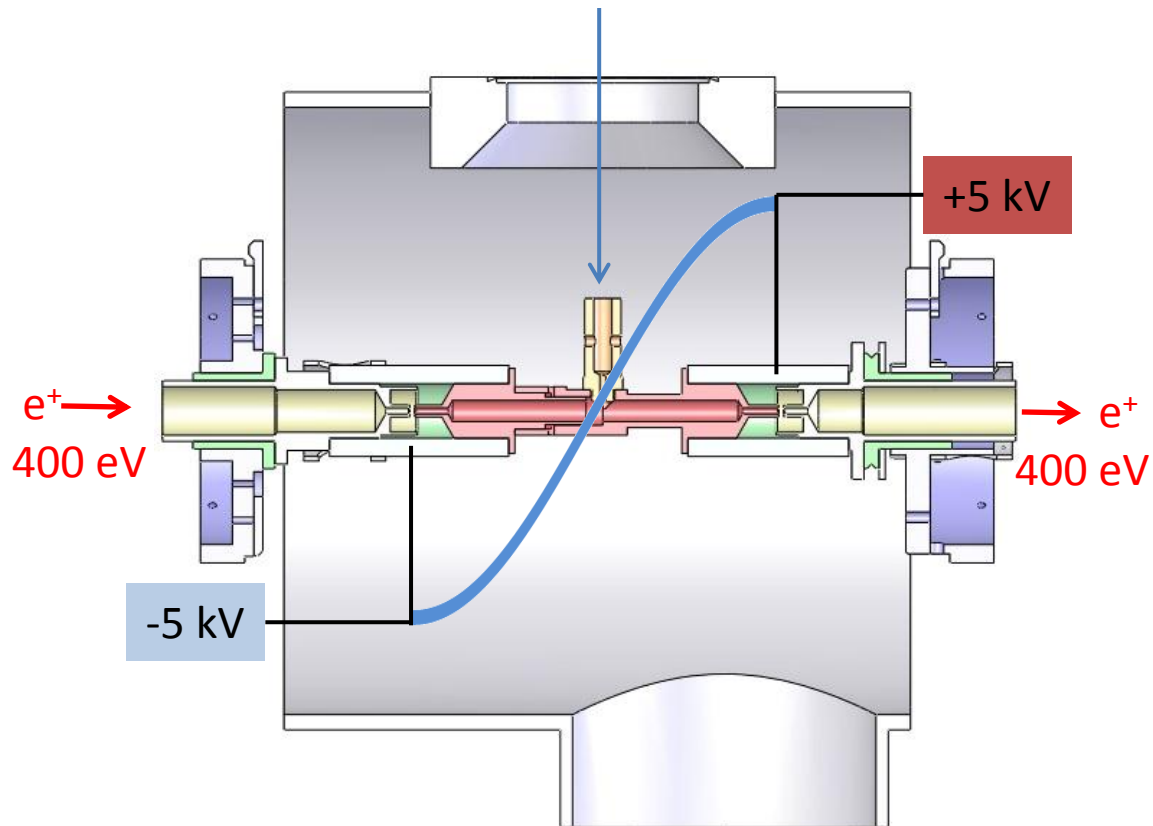


# Electric potentials of the system



# Next step: positron elevator

signal coupled inductive via HF-resonator



frequency	50 MHz
$U_{pp}$	10 kV
power of HF-amplifier	20 W
$Q = \omega_0 \cdot C_{tot} \cdot \frac{U_{pp}^2}{8 \cdot P}$	$\approx 4000$

# Summary

- ❖ SPM interface works successful after restart
- ❖ prebuncher works
- ❖ 1<sup>st</sup> & 2<sup>nd</sup> sine wave buncher work
- ❖ positron elevator will be installed and tested
- ❖ specimen chamber & beam monitor under construction

