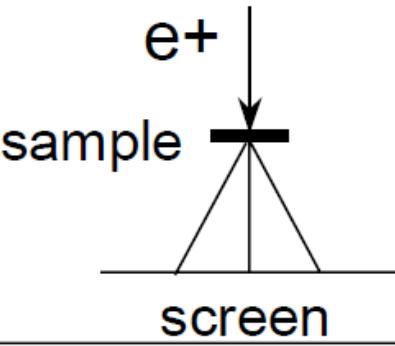
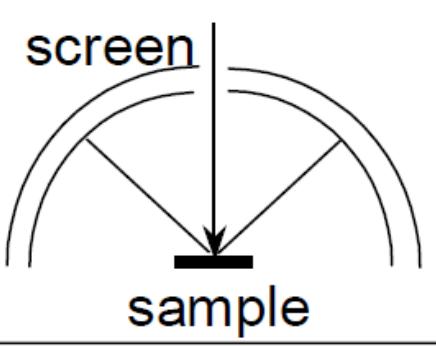
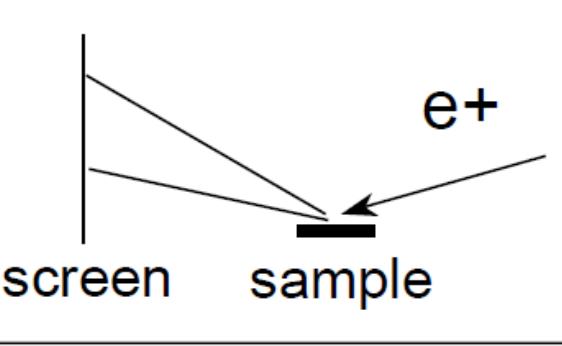


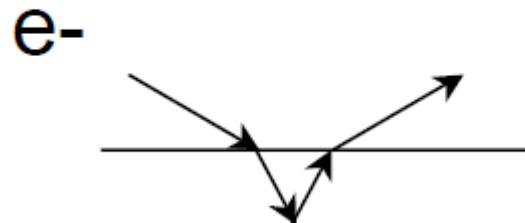
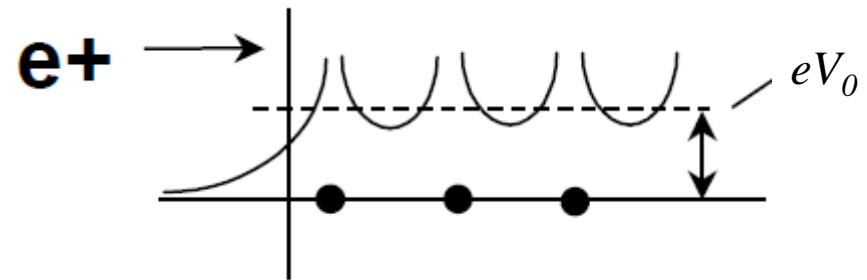
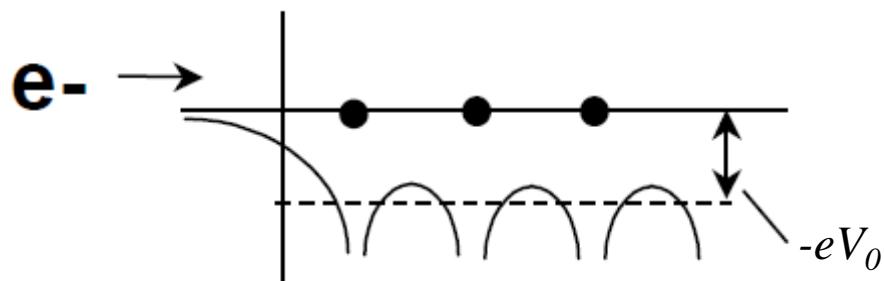
# Difrakce pozitronů

- difrakce pozitronů

		
TPD Transmission Positron Diffraction	LEPD Low Energy Positron Diffraction	<b>RHEPD</b> Reflection High Energy Positron Diffraction
100keV - 1MeV	10 - 500eV	10 - 100keV
Bulk - Study	<b>- Surface - Study -</b>	

# RHEPD = Reflection High-Energy Positron Diffraction

- RHEED
- potenciál pro elektrony
- negativní vnitřní potenciál
- RHEPD
- potenciál pro pozitrony
- pozitivní vnitřní potenciál



# RHEPD = Reflection High-Energy Positron Diffraction

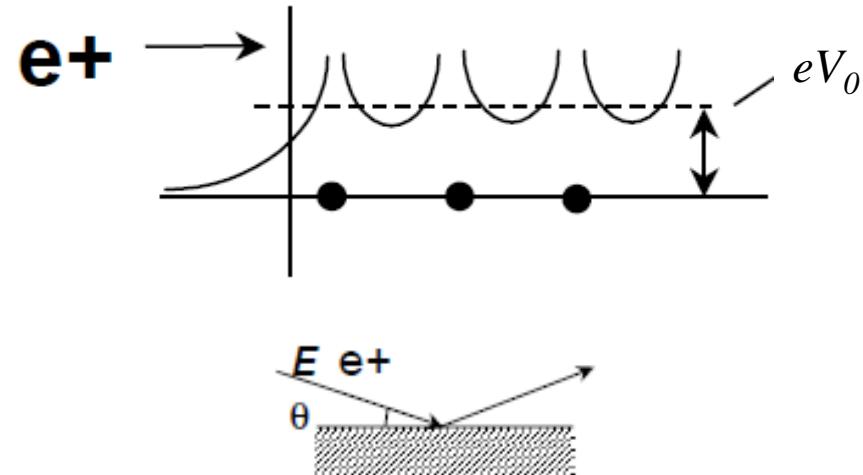
- **RHEPD**

$$\left( -\frac{\eta}{2m} \nabla^2 + eV \right) \psi = E \psi$$

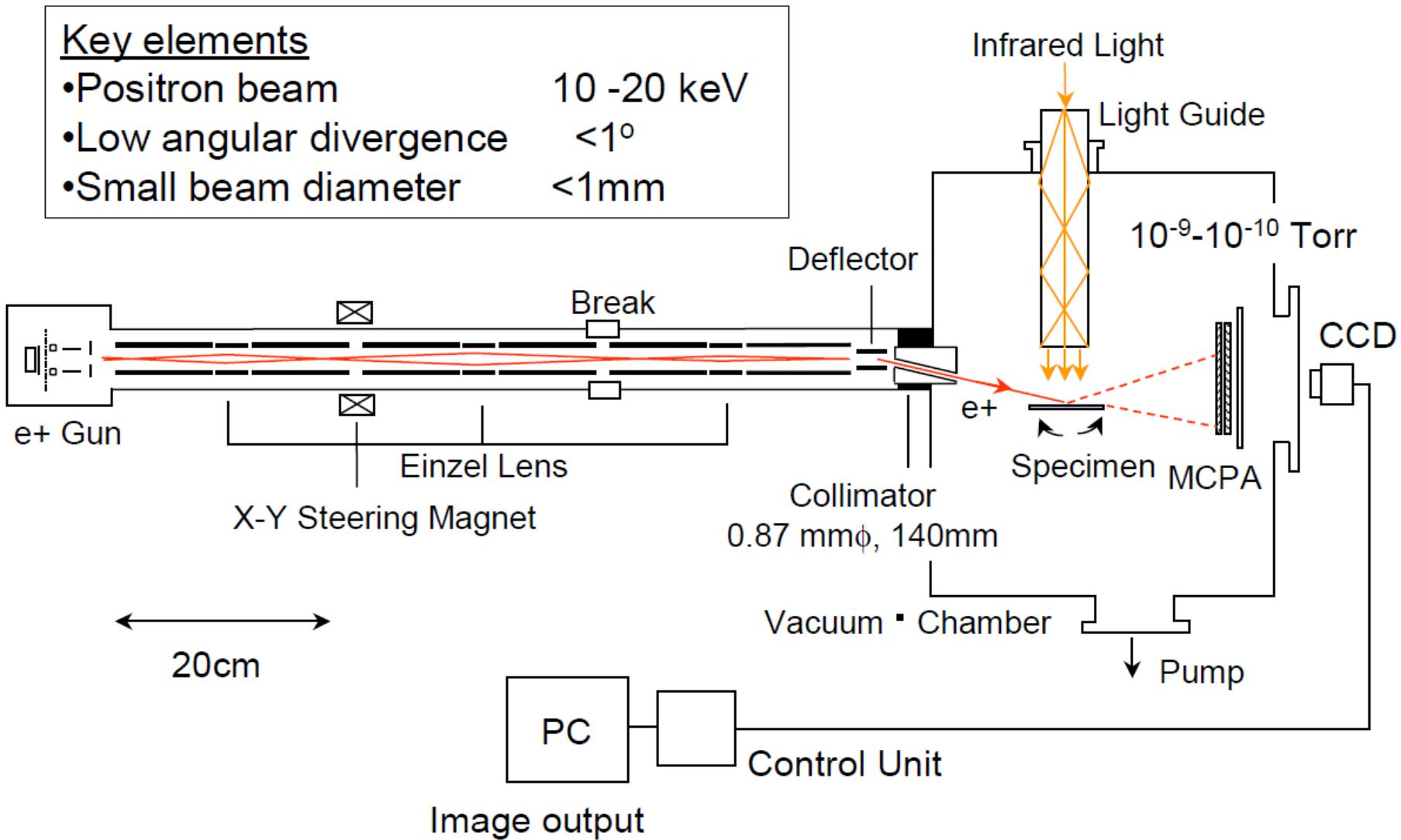
- mimo krystal  $V = 0$
- uvnitř krystalu  $V > 0$
- totální reflexe pozitronů

$$E_0 \sin^2 \theta = eV \Rightarrow \theta = \arcsin \sqrt{eV / E_0}$$

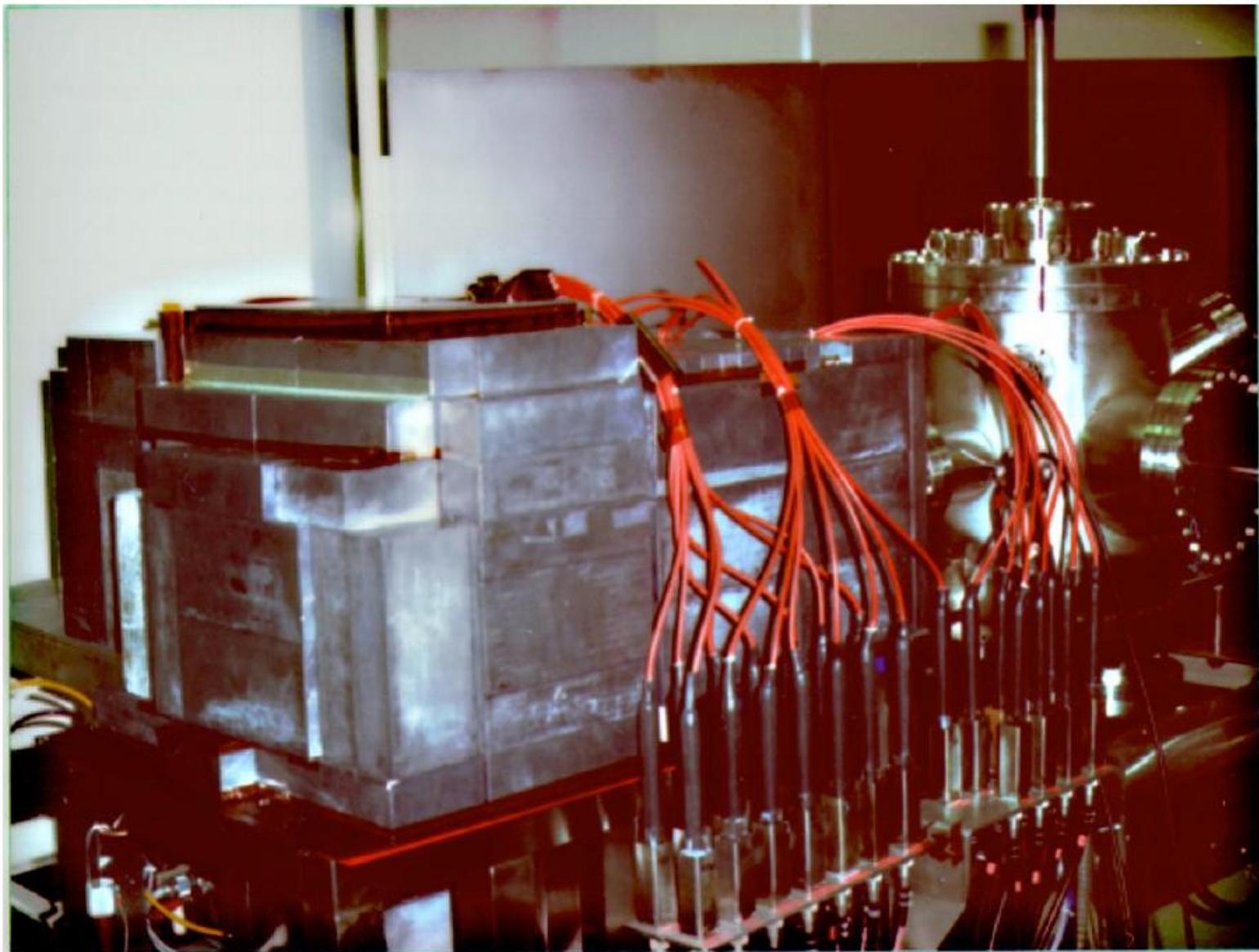
↑  
kinetická energie  $e^+$



# RHEPD = Reflection High-Energy Positron Diffraction

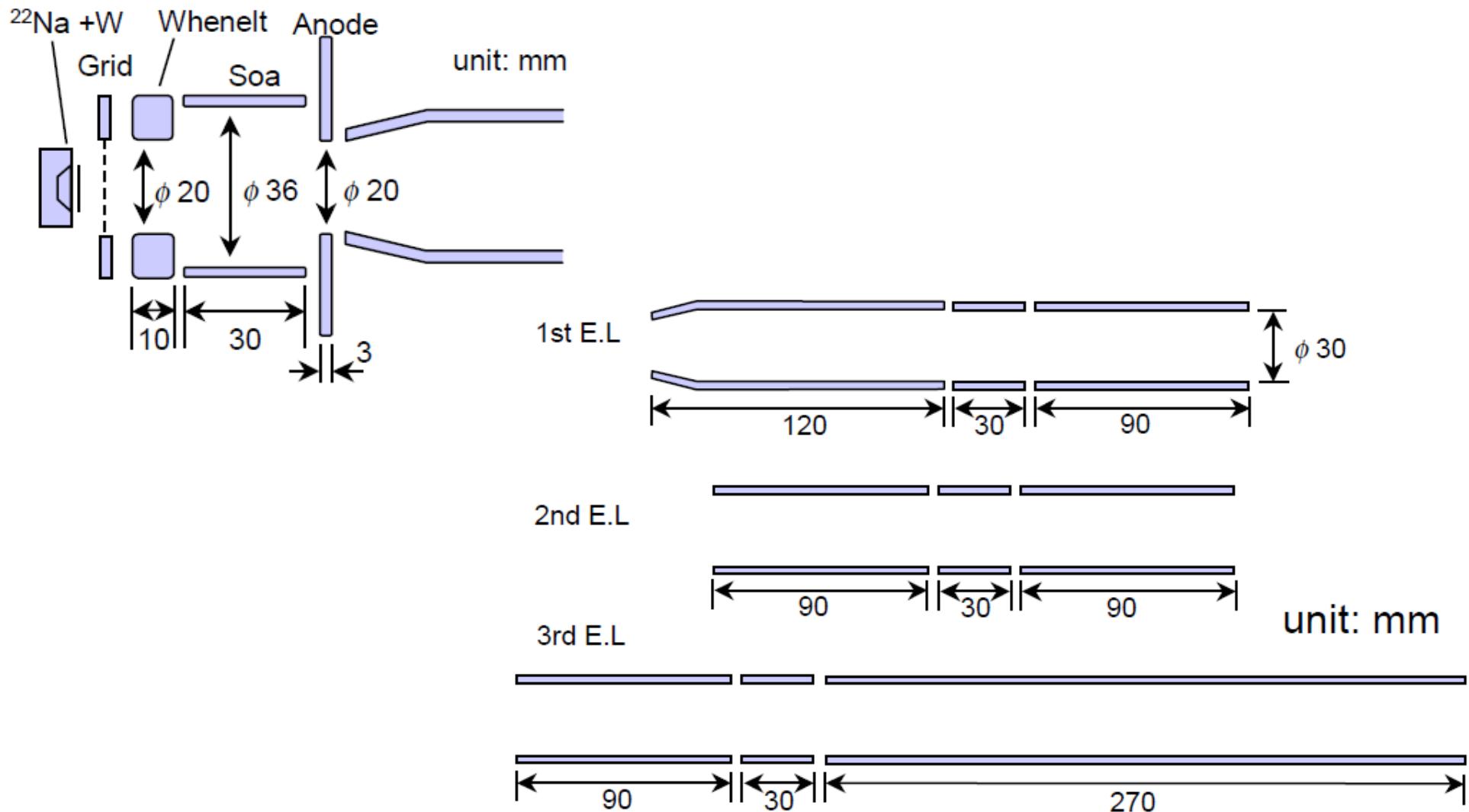


RHEPD = Reflection High-Energy Positron Diffraction



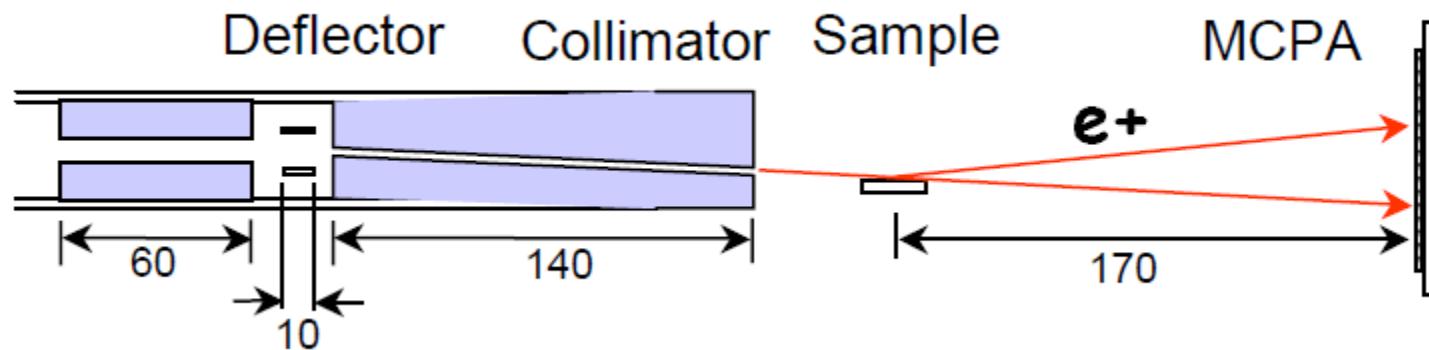
# RHEPD = Reflection High-Energy Positron Diffraction

- elektrostaticicky vedený svazek



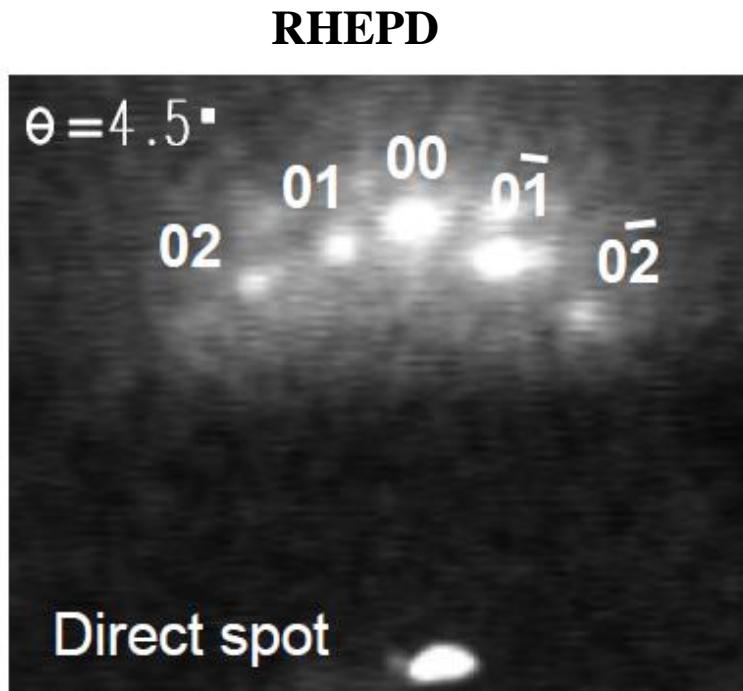
# RHEPD = Reflection High-Energy Positron Diffraction

- elektrostaticky vedený svazek



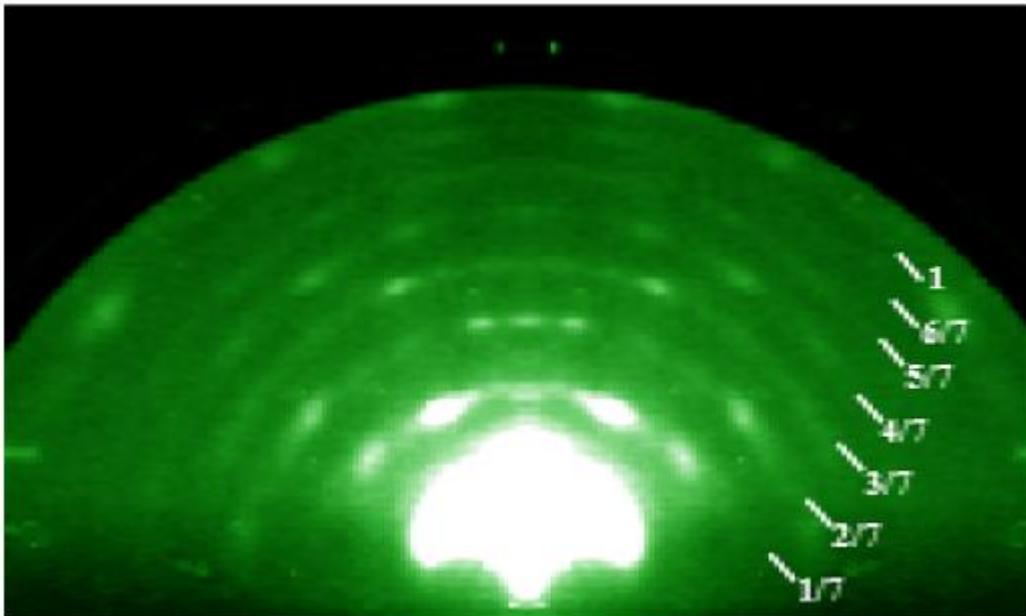
# RHEPD = Reflection High-Energy Positron Diffraction

- Si (111) H



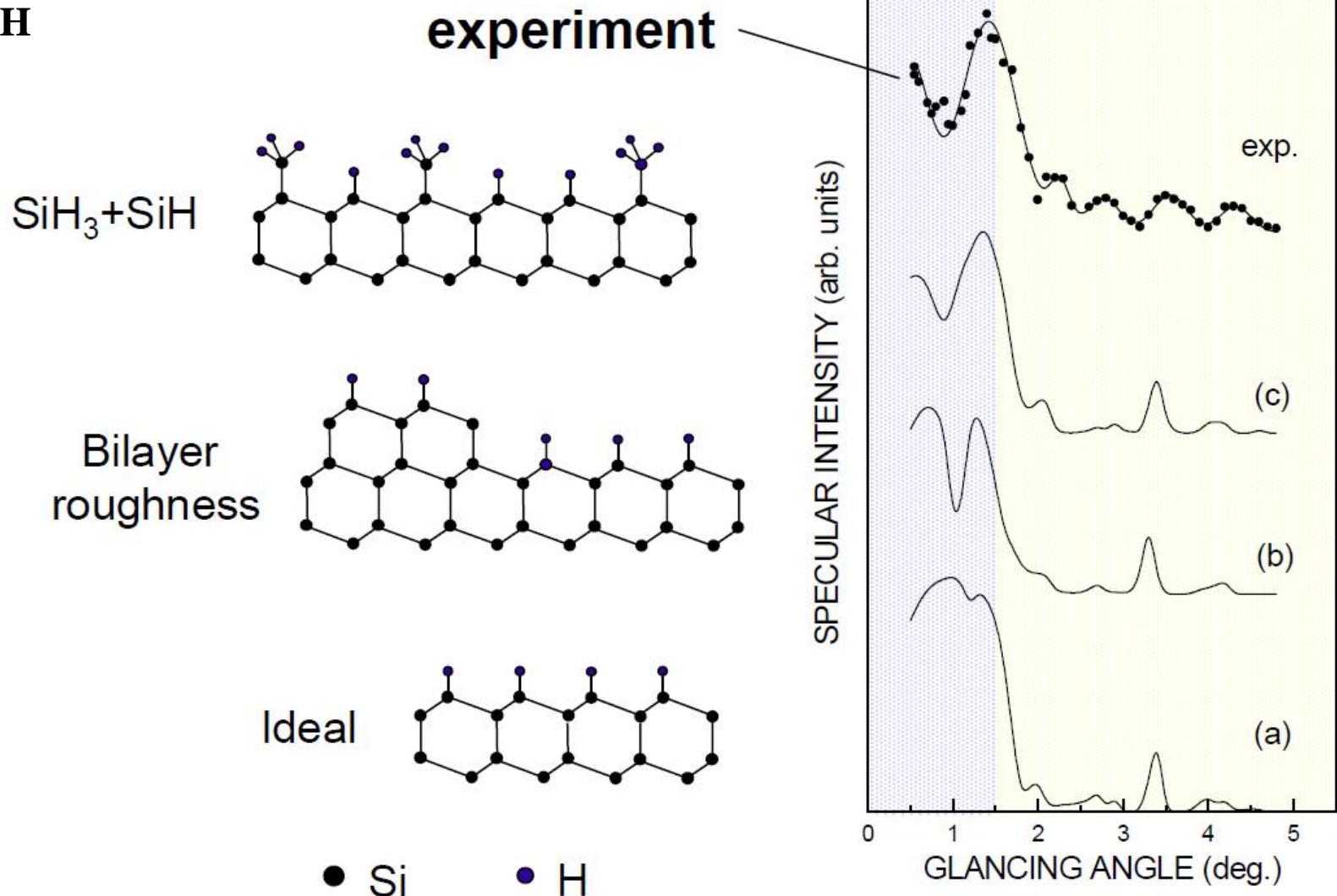
# RHEPD = Reflection High-Energy Positron Diffraction

- Rocking curve
- Si (111) H



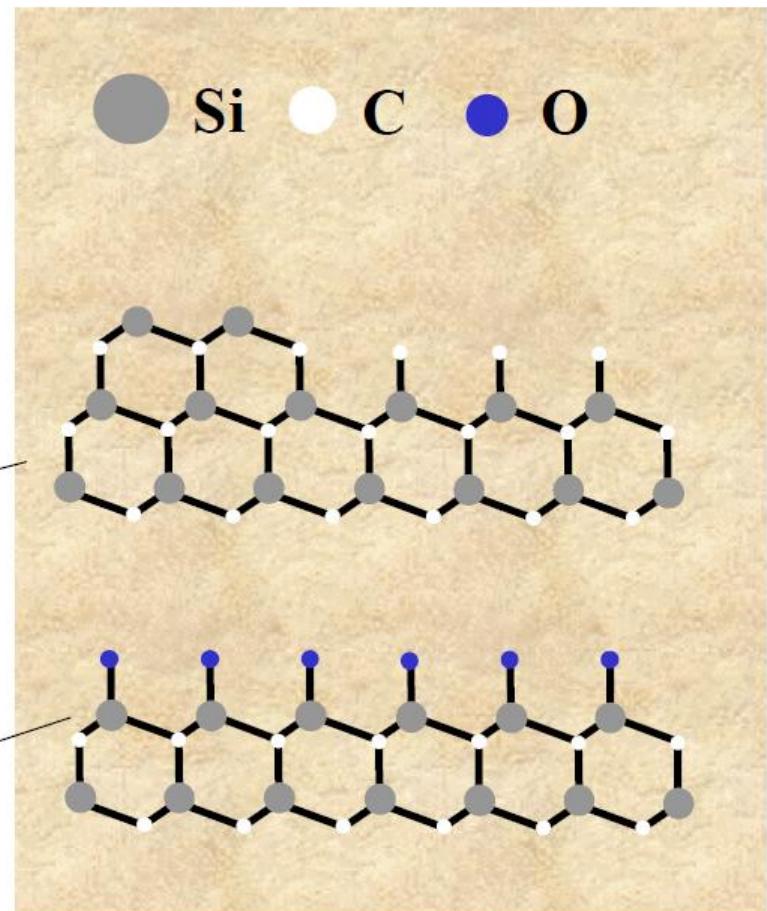
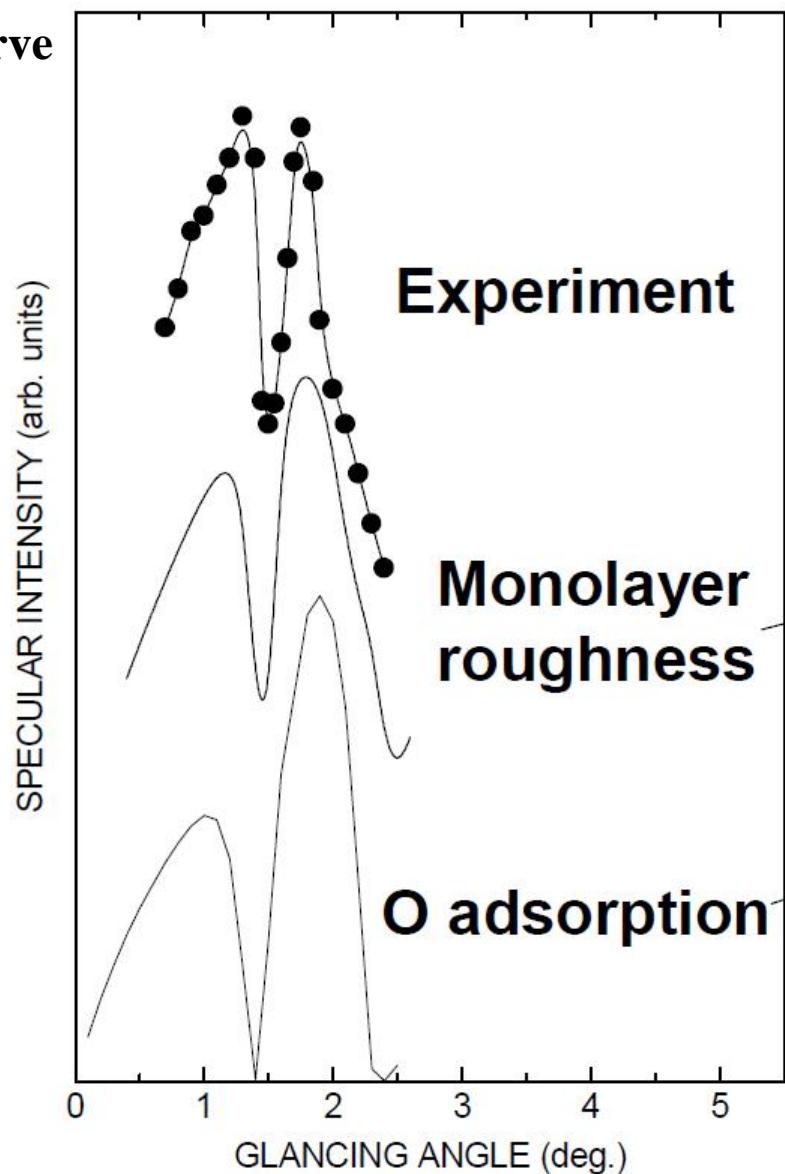
# RHEPD = Reflection High-Energy Positron Diffraction

- Rocking curve
- Si (111) H



# RHEPD = Reflection High-Energy Positron Diffraction

- Rocking curve
- SiC (0001)



# TRHEPD = Total Reflection High-Energy Positron Diffraction

- Si (111) 7 x 7 rekonstruovaný povrch

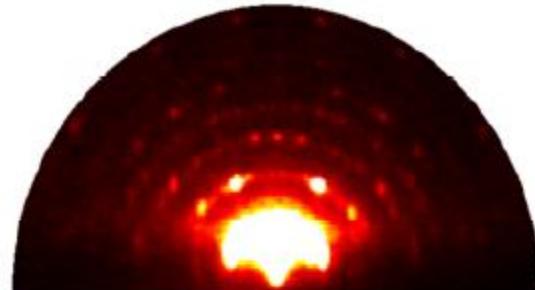
**TRHEPD**

(1)  $\theta = 1.3^\circ$  (total reflection)

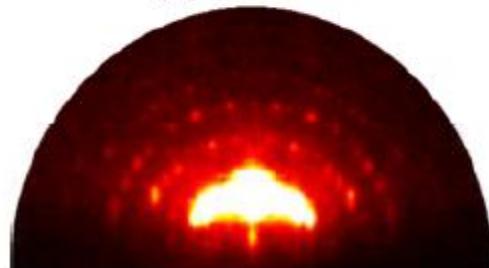


**RHEPD**

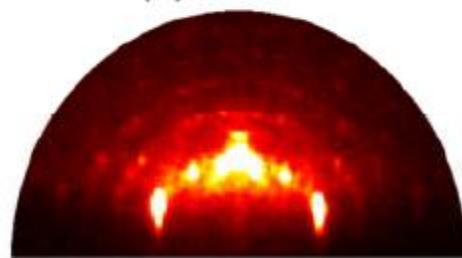
(2)  $\theta = 2.1^\circ$



(3)  $\theta = 2.9^\circ$



(4)  $\theta = 3.9^\circ$



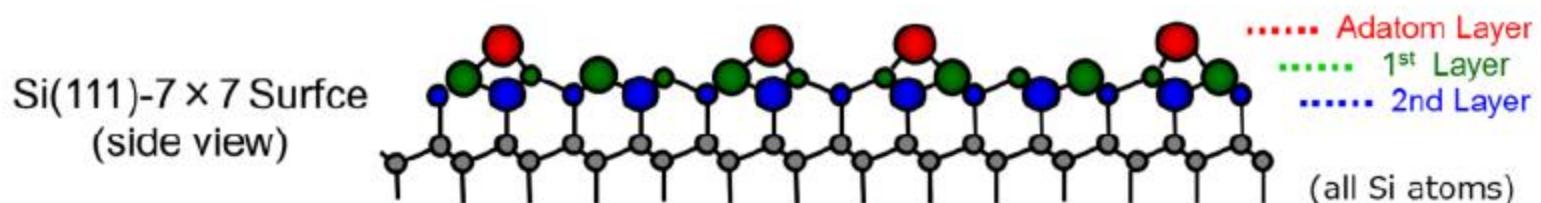
(5)  $\theta = 4.9^\circ$



# TRHEPD = Total Reflection High-Energy Positron Diffraction

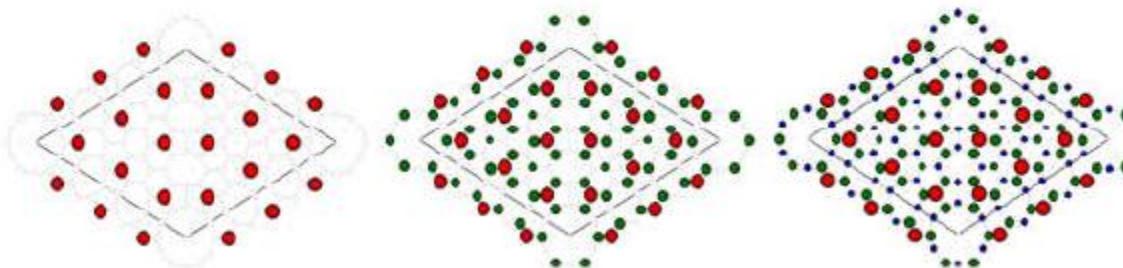
- Si (111) 7 x 7 rekonstruovaný povrch

TRHEPD



Calculation

Adatom layer only (●) Adatom and 1<sup>st</sup> layer (● ●) Down to 2<sup>nd</sup> layer (● ● ●) Whole crystal



Si(111)-7 × 7 Surface (top view)

Experiment

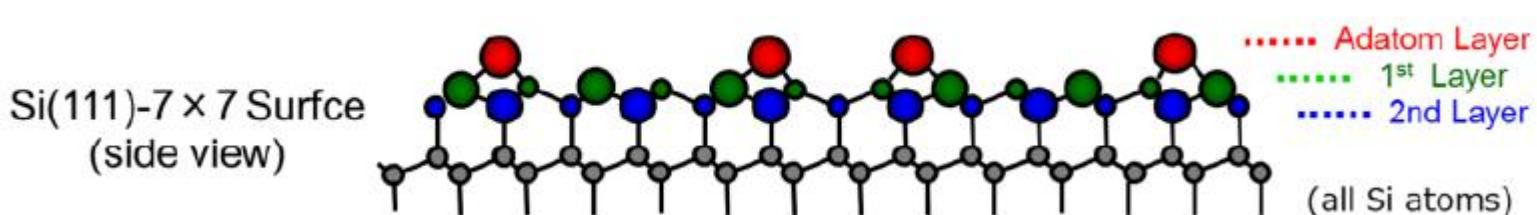


$\theta = 1.3^\circ$   
(total reflection)

# RHEED = Reflection High-Energy Electron Diffraction

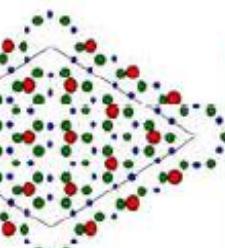
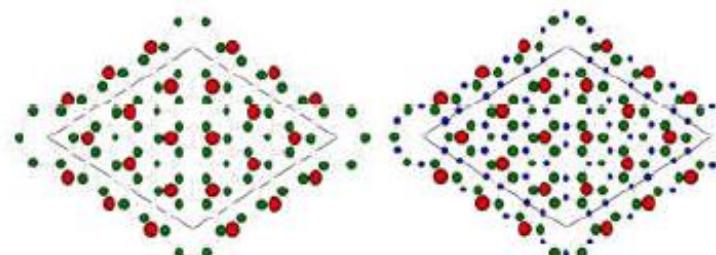
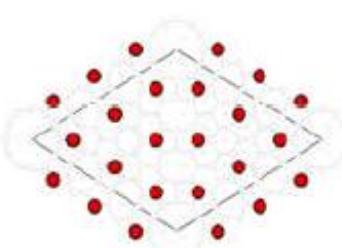
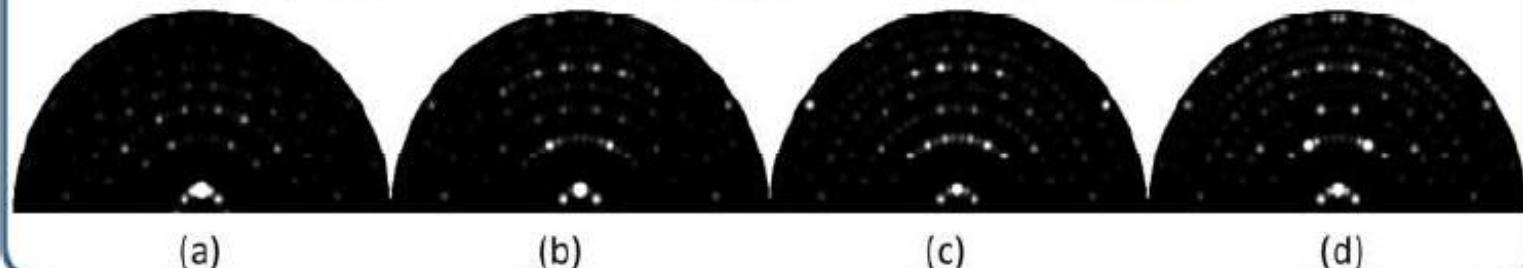
- Si (111) 7 x 7 rekonstruovaný povrch

RHEED



Calculation

Adatom layer only (●) Adatom and 1<sup>st</sup> layer (● ●) Down to 2<sup>nd</sup> layer (● ● ●) Whole crystal



Si(111)-7 × 7 Surface (top view)

Experiment

