

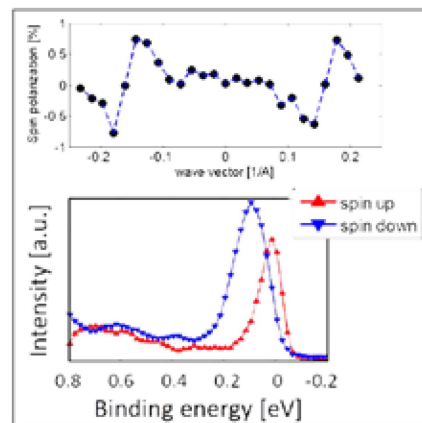
# FOCUS FERRUM & SPIN<sup>Switch</sup>

## 3D SPIN VECTOR DETECTION

For routine and fast spin resolved PES/ARPES

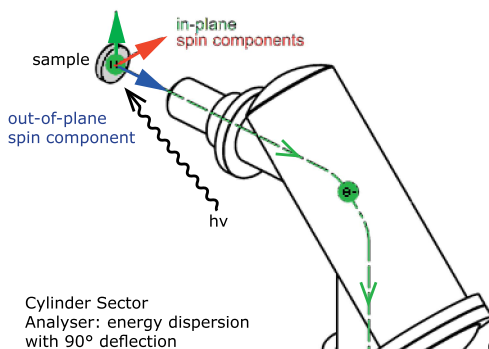
### Benefits

- User friendly operation
- Available for all established ARPES analyser
- Ultimate sensitivity (figure of merit)
- Highly efficient SEMPA

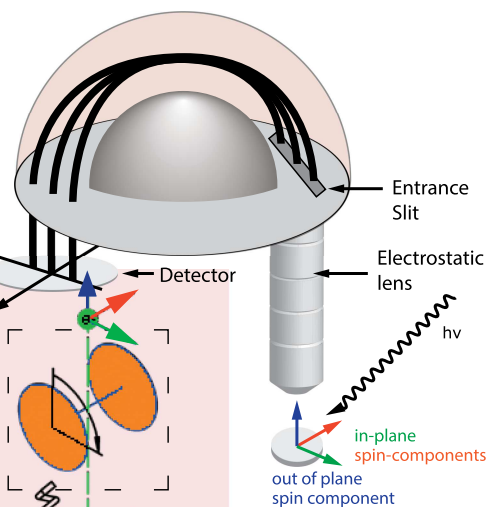


Au(111) Spin-split surface state.

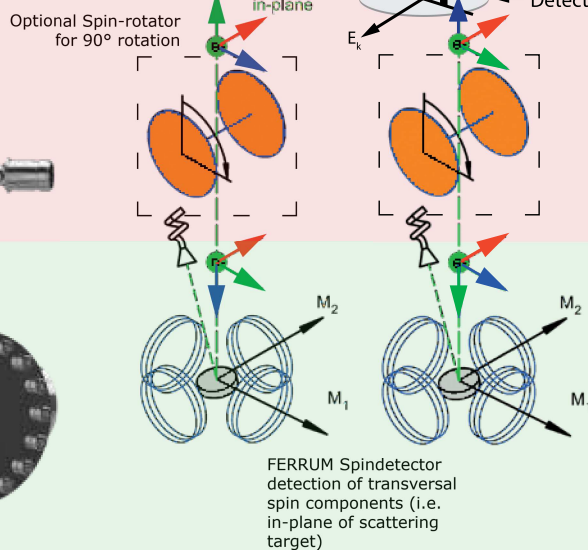
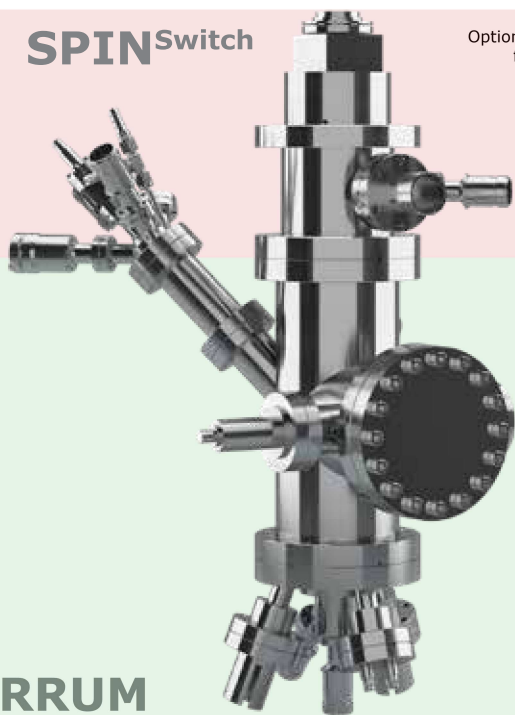
### Easy SPIN



### ARPES analyser



### SPIN<sup>Switch</sup>

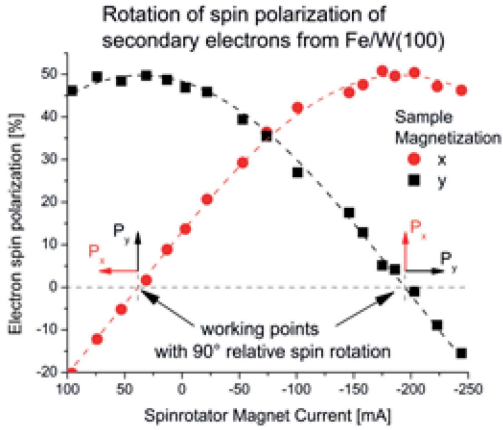


FERRUM Spindetector detection of transversal spin components (i.e. in-plane of scattering target)

### FERRUM

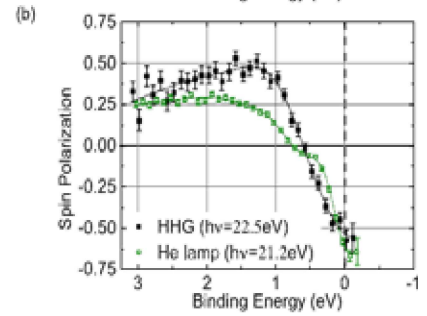
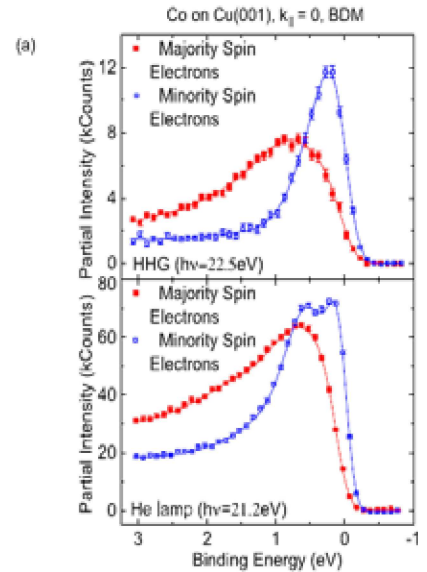
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## Characterization of the SPIN<sup>Switch</sup>



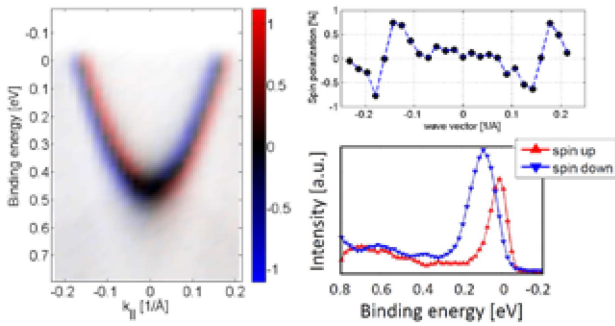
The spin detection in the FERRUM is based on Very-Low-Energy Electron Diffraction (VLEED) where an incoming electron beam is scattered at a magnetized and oxygen passivated iron film grown on a tungsten crystal. The scattered electron beam is directed onto a channeltron. The SPIN<sup>Switch</sup> electron optics in front of the FERRUM selects the spin direction of interest to be measured. Hence all 3 D spin components are accessible w/o sample rotation or an additional 90° deflection.

## Spin polarized UPS

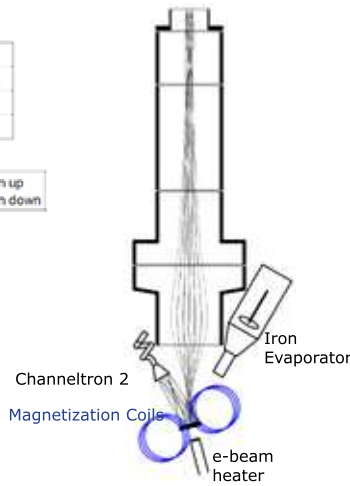


Data: M. Plötzing et al. Rev. Sci. Instrum., 87 (2016)

## Spin polarized ARPES

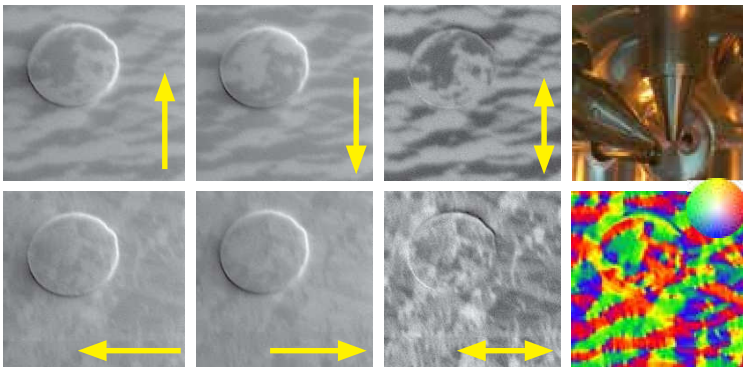


Au(111): Spin-split surface state  
Data courtesy L. Plucinski, PGI 6, FZ Jülich



FERRUM operation principle for spin resolved measurements

## SEMPA using FERRUM



1st SEMPA data acquired with FERRUM detector: Fe 1 nm on patterned CFB/Si, FoV ~40 μm  
Data courtesy of Chanyong Hwang, Center for Nanometrology KRISS

## FERRUM Specifications

Scattering energy:	6.3±0.1 eV
Sherman function:	S=0.29±0.01
Reflectivity (I/I <sub>0</sub> ):	R>10.6%
Figure of merit :	FoM=8,8x10 <sup>-3</sup>
Lifetime (without preparation):	Several weeks (!!)