FOCUS FERRUM & SPIN^{Switch} 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



Figure 5: Au(111) Spin-split surface state.





Characterization of the SPIN^{Switch}



Spin polarized ARPES



Data courtesy L. Plucinski, PGI 6, FZ Jülich

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^{Switch} 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.





FERRUM operation principle for spin resolved measurements

Iron Evaporator

e-beam

SEMPA using FERRUM

0.8 0.6



0 ave vector [1/A

0.4 0.2

Binding energy [eV]

0 -0.2

spin up

spin down

Channeltron 2

Magnetization Co

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 ₀):	R>10.6%
Figure of merit :	FoM=8,8x10 ⁻³
Lifetime (without preparation):	Several weeks (!!)