



JRA NEUTRON OPTICS

Neutron Reflectometry by Refractive Encoding

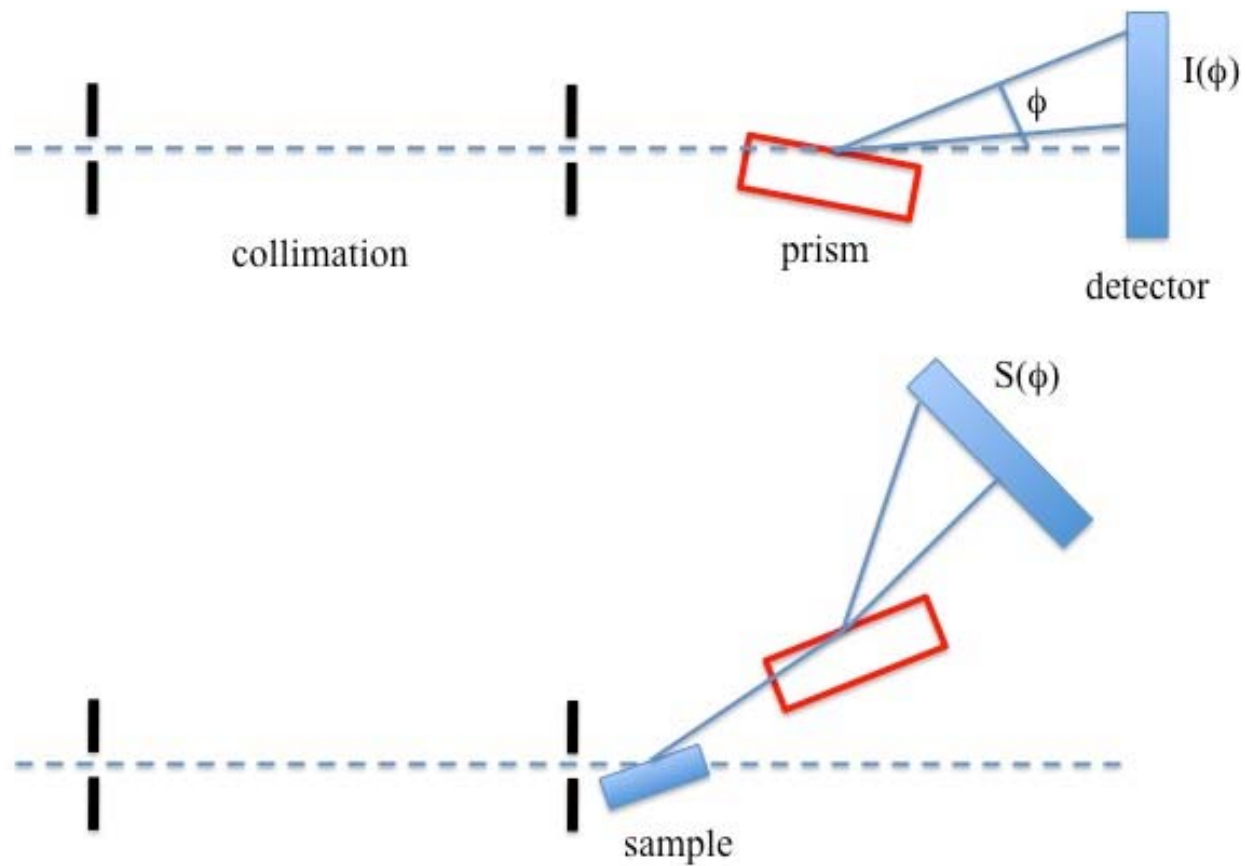
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Principle

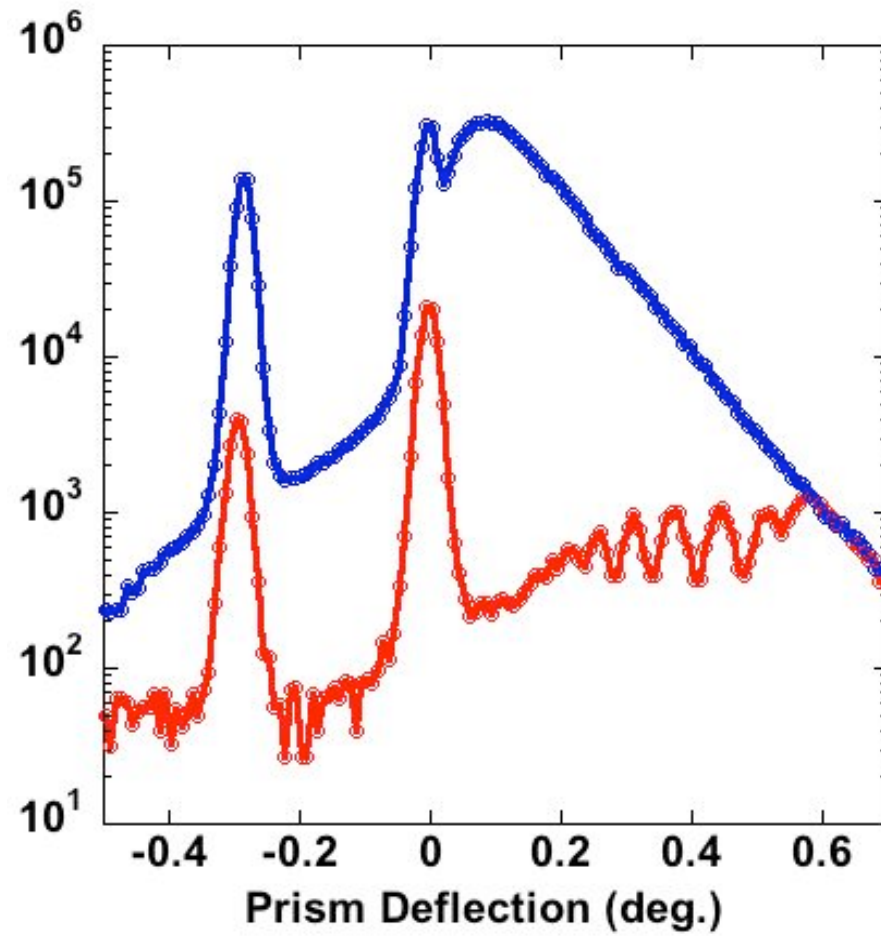




Experiments performed on AMOR at PSI

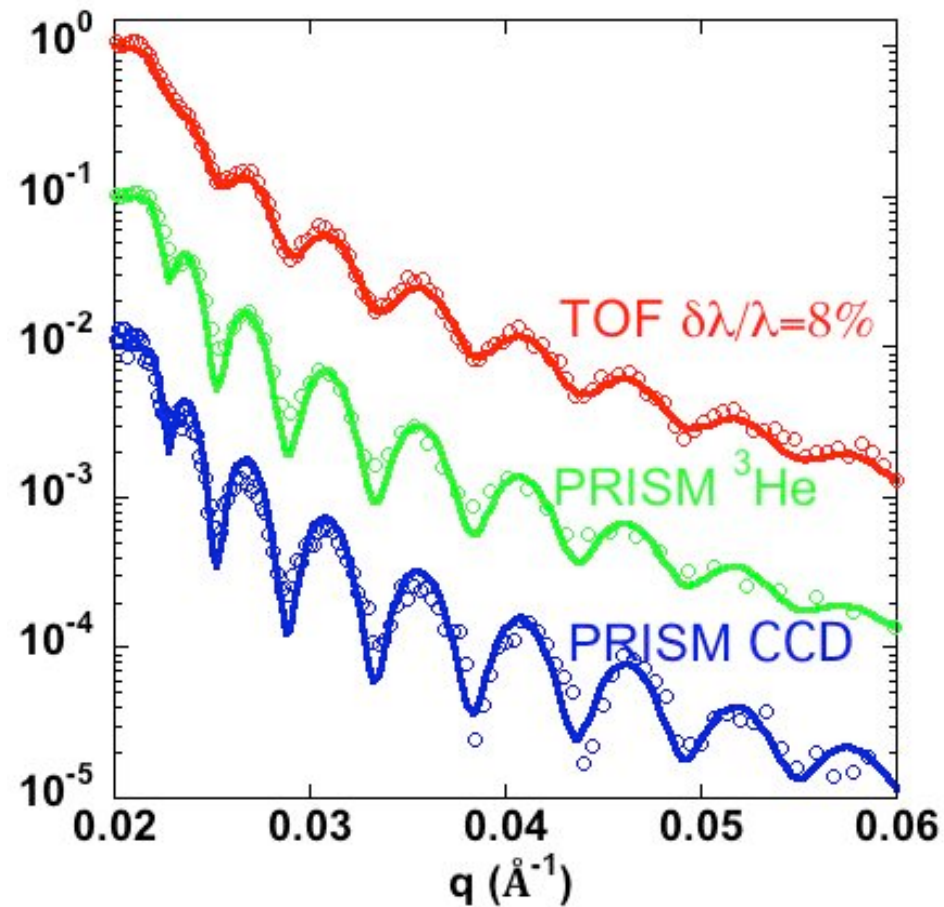
- Collimations 0.5mm / 1.6m apart
- PRISM set 0.742m after the sample
- ^3He detector (6m from the sample) / resolution 2.4mm FWHM
- CCD camera / 5.1m from sample / resolution 0.2 mm / efficiency 10%
- Sample Ni/glass (50 x 140mm²)

Measurements





Actual reflectivities





Method	$\Delta\lambda/\lambda$ (3.7 Å)	$\Delta\lambda/\lambda$ (11.0 Å)	Gain (3.7 Å)	Gain (11.0 Å)
TOF AMOR $\Delta x=2.4$ mm $D_1=1.58$ m $D_2=5.1$ m	0.08	0.08	1	1
Prism $\Delta x=2.4$ mm $D_1=1.58$ m $D_2=5.1$ m	0.087	0.032	33	3.2
Prism $\Delta x=0.2$ mm $D_1=1.58$ m $D_2=5.0$ m	0.063	0.023	33	3.2
TOF D17 1s data $D_1=3.0$ m $D_2=3.0$ m $s_1=5$ $s_2=1.5$ $th=1.5$ chopper opening 4 deg.	0.10	0.04	1	1
Prism D17 $\Delta x=0.2$ mm $D_1=3.0$ m $D_2=3.0$ m $s_1=2$ $s_2=0.5$ $th=1.5$	0.11	0.035	8.0	2.0
TOF D17 $D_1=3.0$ m $D_2=3.0$ m $s_1=1$ $s_2=0.5$ $th=1.0$ chopper opening 2.4 deg.	0.065	0.031	1	1
Prism D17 $\Delta x=0.2$ mm $D_1=3.0$ m $D_2=3.0$ m $s_1=1$ $s_2=0.5$ $th=1.0$	0.065	0.028	92	22



CONCLUSION

- Very efficient for high resolution experiments
- Kinetic measurements
- Limitation: high resolution detector required ($x \sim 0.2\text{mm}$)