NSLS-II SRX Beamline Docs Documentation

Release 0.1

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These pages are the documentation of the SRX beamline (5-ID-1) at the NSLS-II.

CHAPTER

ONE

SRX (5-ID-1) BEAMLINE DOCUMENTATION

1.1 Contents

1.1.1 SRX KB mirrors

Introduction

There are two sets of KB mirrors in the SRX endstation, one high-flux pair and one high-resolution pair.

High-flux

Mir:2 - High-flux VFM

Mechanics

- Weak link flexures for all translations
- Vertical translation system has four stepper motors, so is overconstrained. Extra axis is twist, and needs to be maintained at zero.
- Horizontal translation for stripe selection done by two SmarAct actuators. These actuators have limited ability to yaw, and as a result can get stuck.
- Longitudinal translation by single SmarAct actuator.

Motion control

- Delta Tau coordinate system implemented for Mir:2 vertical movements: vertical translation, pitch, roll, twist.
- Twist should be maintained at zero.
- A PLC monitors the twist and deactivates the vertical motors if the calculated twist exceeds a specified value.

Mir:3 - High-flux HFM

Mechanics

- Weak-link flexure for all stages.
- No overconstrained systems.

Motion control

Motion axes

Mirror system	Axis	Motor type	Controller	Notes
Mir:2 (high-flux vertical focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (4)	Delta Tau	Overconstrained mechanical system
	Z	SmarAct (1)	SmarAct MCS	
Mir:3 (high-flux horizontal focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (1)	Delta Tau	

High-resolution

Mir:4 - High-resolution VFM

Mechanics

- Weak link flexures for all translations
- Vertical translation system has two stepper motors, so is not overconstrained.

Motion control

Mir:5 - High-resolution HFM

Mechanics

- Weak link flexures for all translations
- Downstream X translation motor is in line with mirror center, so this motor does not move to implement pitch movement.

Motion control

- Roll motor has approximately +/- 5 degrees of movement.

Motion axes

Mirror system	Axis	Motor type	Controller	Notes
Mir:4 (high-resolution vertical focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (2)	Delta Tau	
	Z	SmarAct (1)	SmarAct MCS	
Mir:5 (high-resolution horizontal focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (1)	Delta Tau	
	Roll	Attocube ECGt5050	Attocube ECC100	

Instructions

SmarAct motor closed-loop operation

- To activate closed-loop operation, set the 'Closed Loop' button on the desired axis to Enable.
- Moving the axis will reset this to 'Disable' but the axis will remain in closed-loop.
- The motor should show 'Holding' after the move has complete. 'Stopped' indicates open-loop operation.
- To deactivate closed-loop operation, set the 'Closed Loop' button on the desired axis to Disable. Even if it is already showing Disable, this will move the motor into open-loop operation.
- Pressing 'Stop' will stop movement and put the motor into open-loop.

Mir:5 roll referencing

- Turn on both auto-reference and auto-reset in Advanced display.
- Move axis over full range until 'Referenced' light turns green.
- Turn off both auto-reference and auto-reset.

CHAPTER

TWO

DOWNLOADS

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