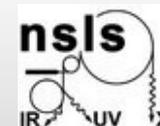


In preparation for Automated Data Acquisition

Kun Qian

X6A SAC, March 15, 2010



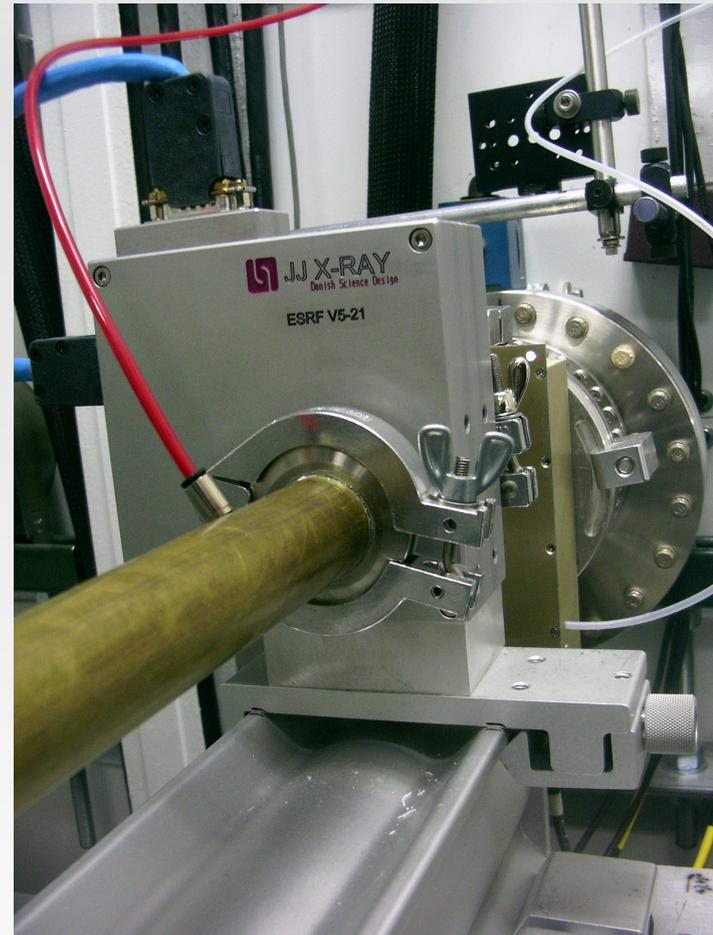
Overview

- Hardwares
 - JJ X-ray Slits
 - Camera motors
 - Sample illumination
 - Laser detector
- Control system
 - Sample viewer
 - Energy scan selection
 - Code remodeling
 - Zooming reset
 - Save view action
 - Connections



Hardware improvement (JJ slits)

- JJ X-Ray Slit (ESRF V5-21)
 - Scan slits
 - A tool for beam profile
 - Second source for KB mirror



Automation improvement

- Automation Situation at X6A
 - ALS automounter & control system
 - Auto crystal-centering module by summer intern Jain

J. Synchrotron Rad, 14: 355-360, 2007
- Integration problems & solutions
 - Image Quality
 - Sample viewer
 - Sample illumination
 - System Stability
 - Inline camera zooming and focusing
 - Sample mounting/unmounting failure
 - Integration (Auto-centering & protocols)

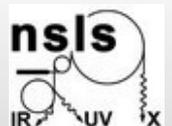


Image Quality Problems & solutions

Sample Viewer

- Image resolution

- 352 x 240

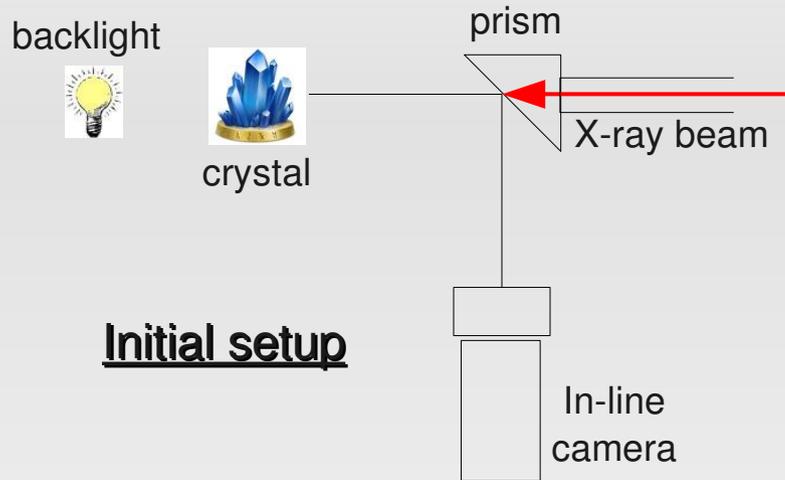


- 704 x 480



Image Quality Problems & solutions

sample illumination



- Initial configuration:
 - backlight
- Improved configuration:
 - LED + backlight reflector

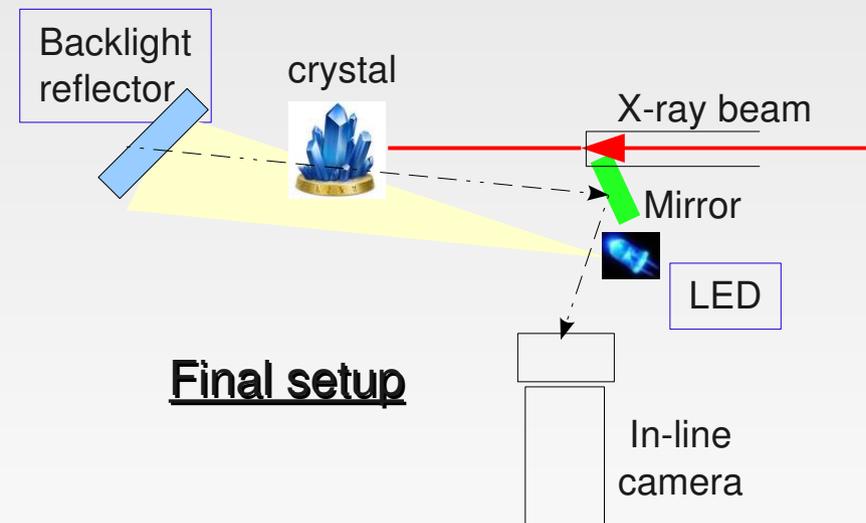


Image Quality Problems & solutions

sample illumination

- Early prototypes
- Final setup
 - Uniform background
 - Better contrast
 - Easy alignment
 - Cheap and long-life LED
 - Easy LED switching

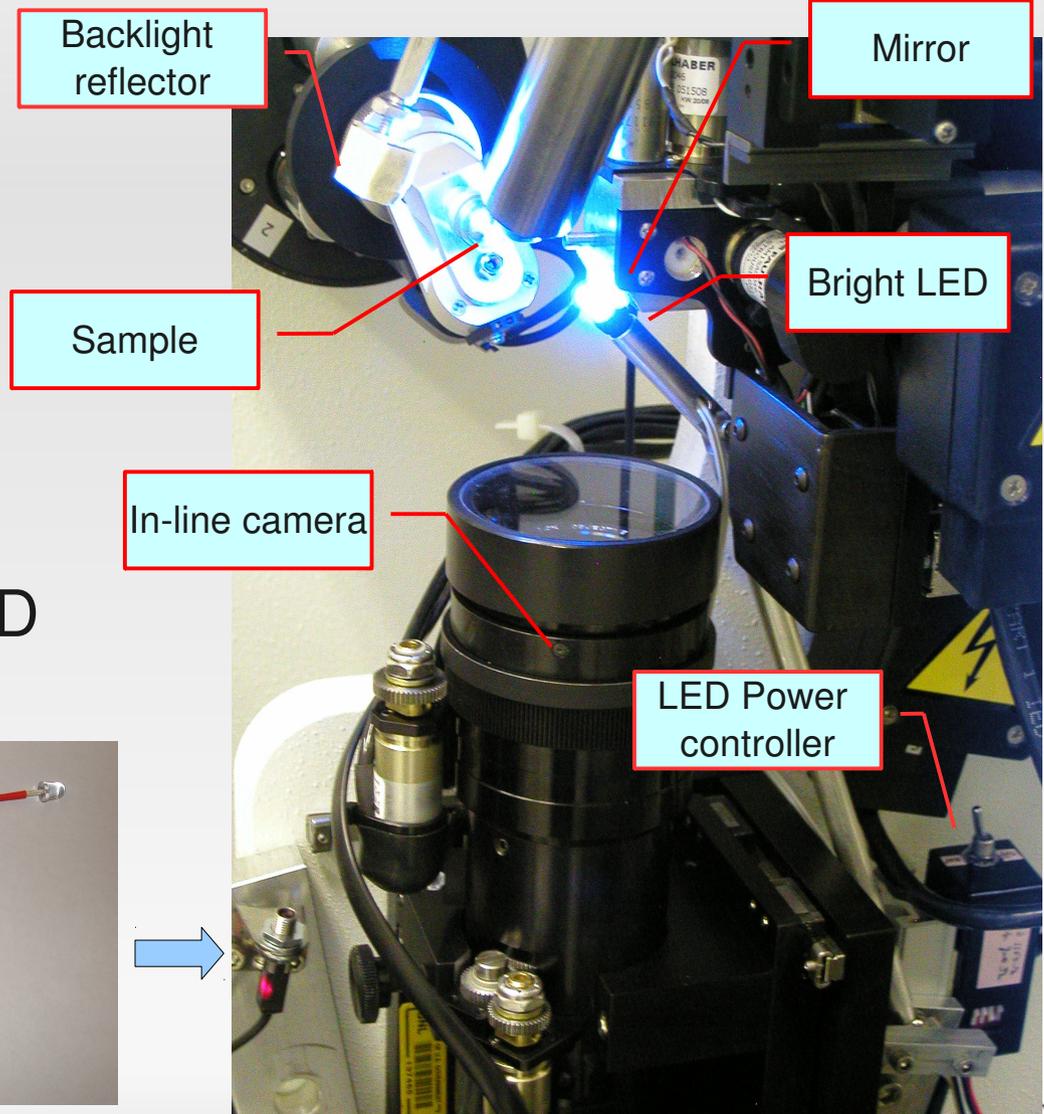
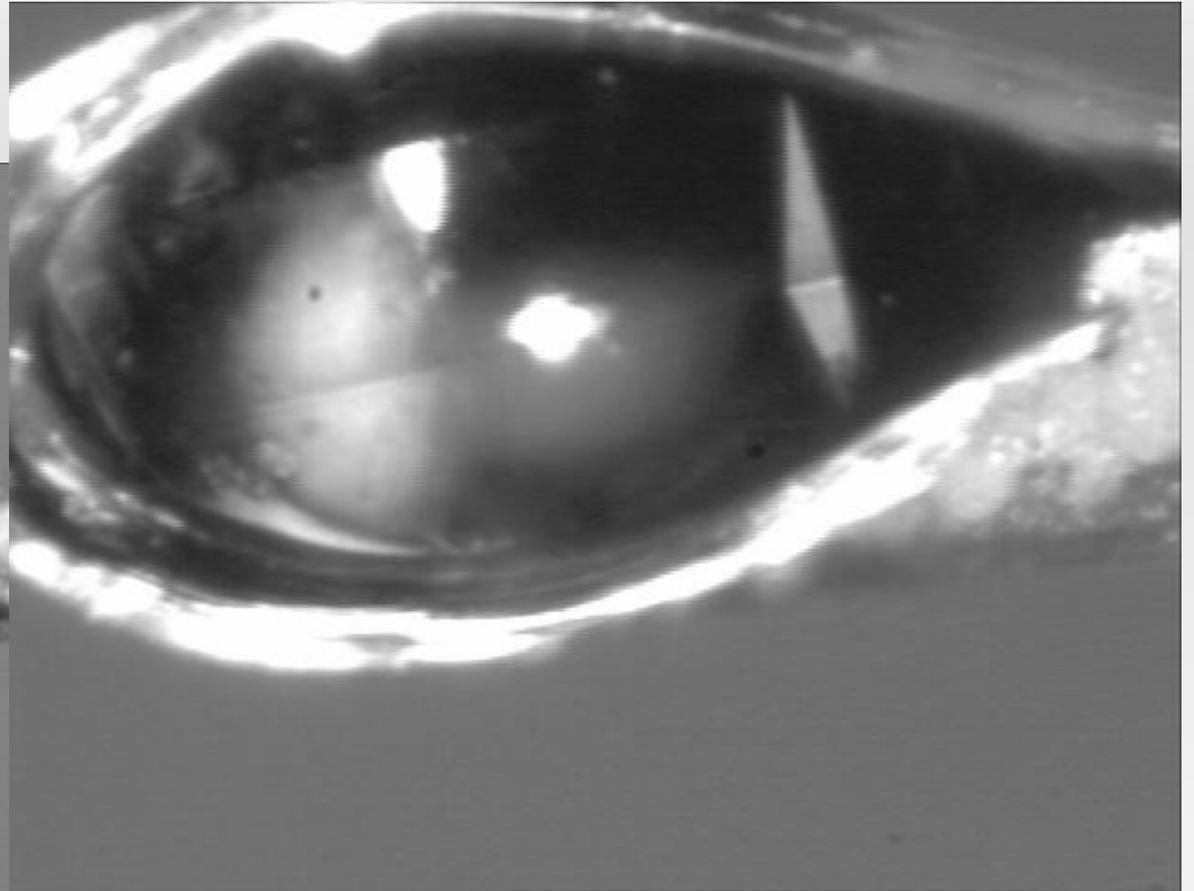
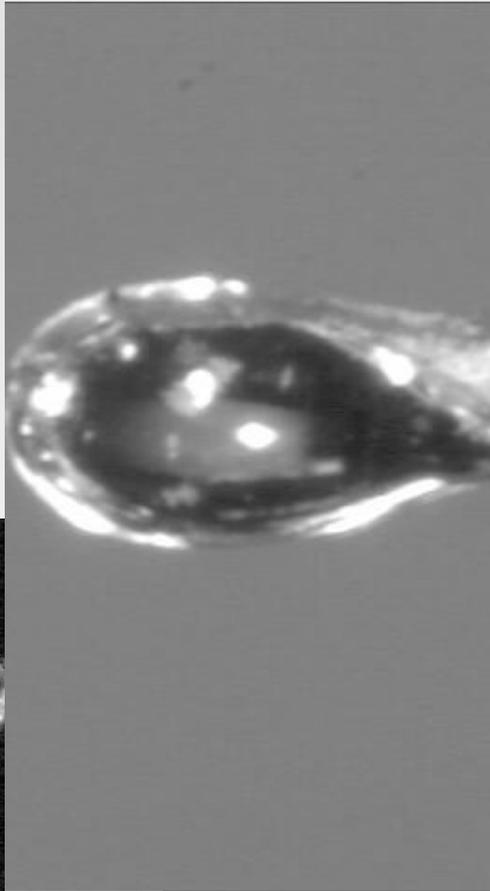
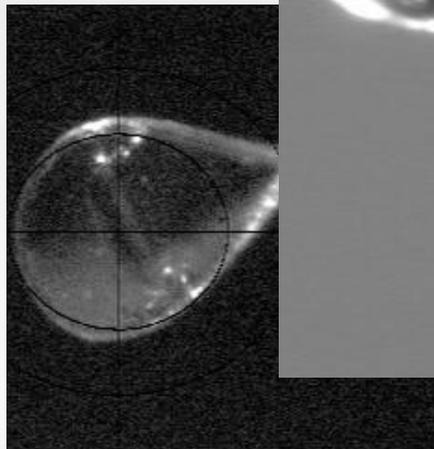


Image Quality Problems & solutions

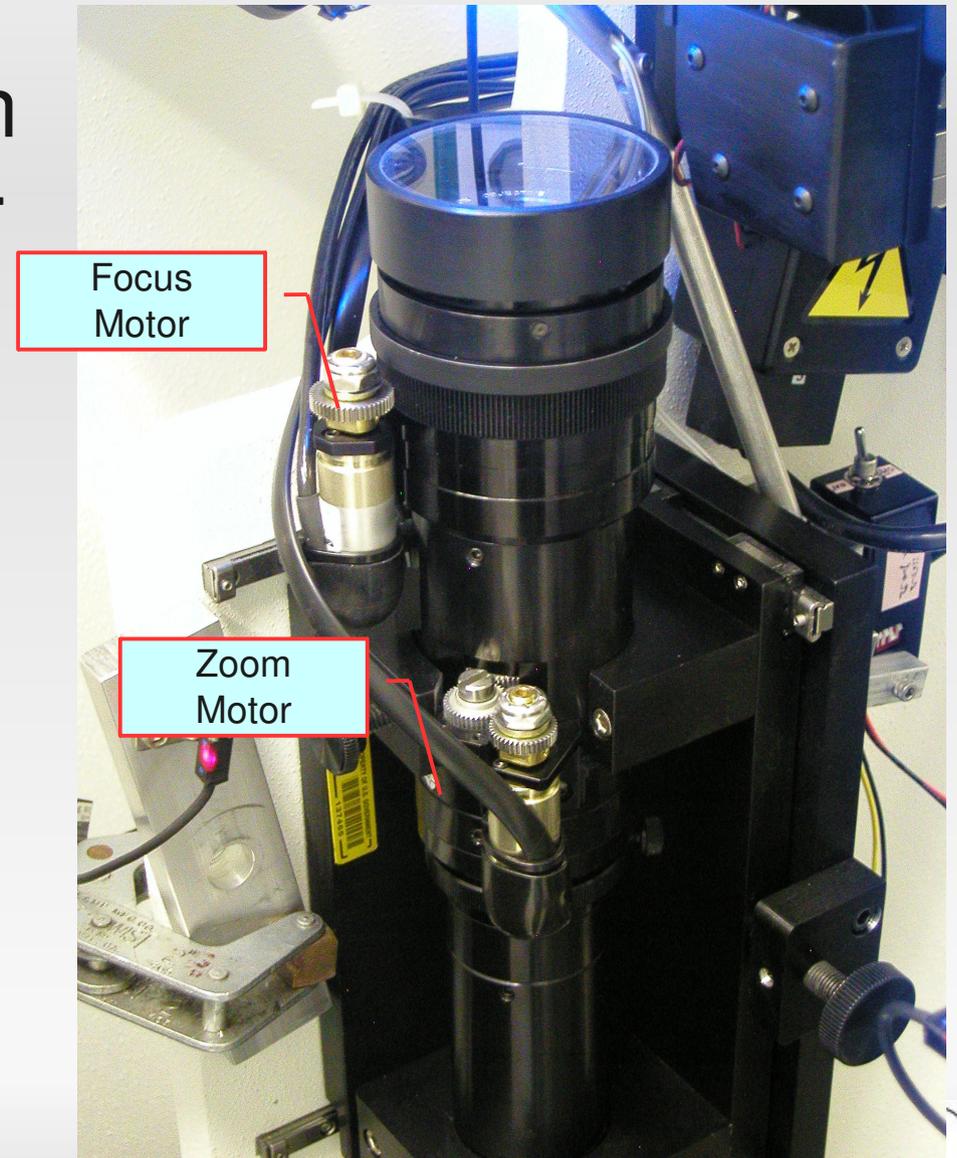
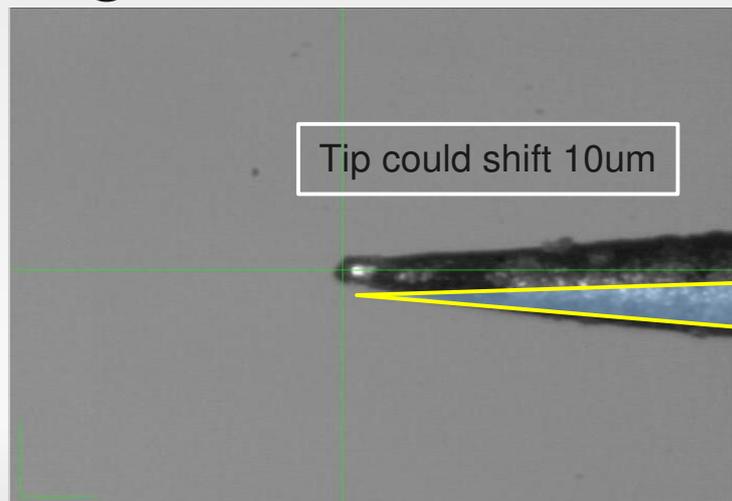
Improved image quality



System Stability Problems & solutions

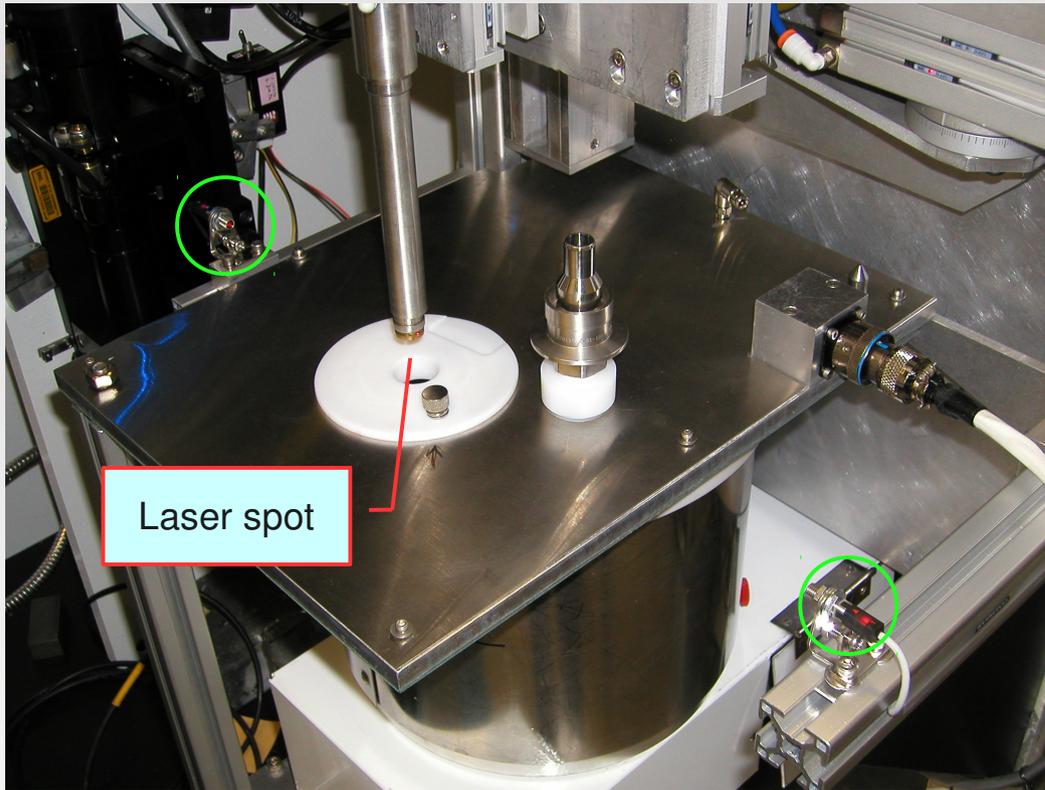
camera motors

- Replacement of a high resolution focus motor
- Backlash removal
- Image shifting diagnosis



System Stability Problems & solutions

laser sensor

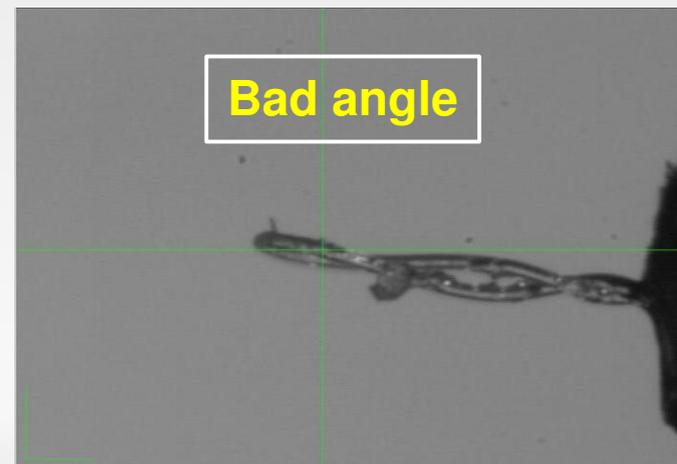
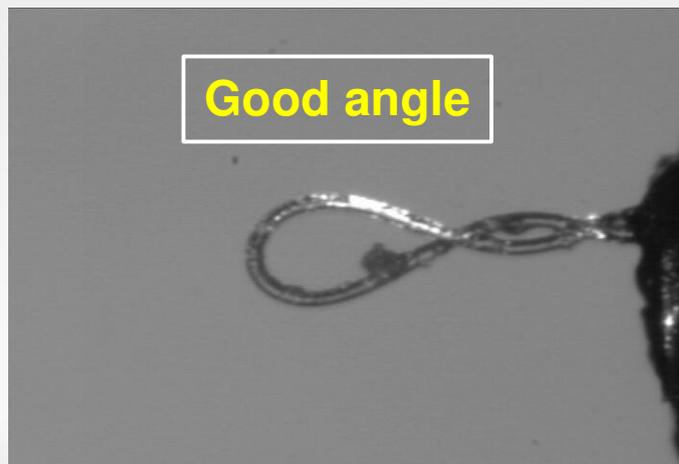


- Purpose
- Features
 - Class 1 laser
 - Small beam size (1.2 mm)
 - Respond time(>80 us)
 - Threshold setting and operation mode setting
 - Easy mount and stable readout
- Connection & control

Problems & solutions (cont.)

auto-centering and protocols

- Scheduled Tasks
 - Diagnose errors in crysCent
 - Seek solutions
 - Prepare new protocols
 - Test stability



Miscellaneous improvements

- Energy scan selection
- Code remodeling
- Zooming reset
- Save view action
- Solved synchronization issues



Summary

- Several improvements are done
- More are expected
- Approach to reliable automation step by step

Thank You!

