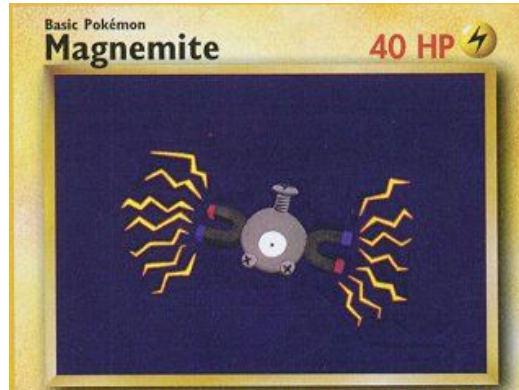# CHESS Run Winter 2016 Log

February 17-23, 2016

Participants: Fridah Mokaya, Ken Finkelstein, Brendan Pratt,
Richard Jones

Table of Contents

Goals for this run

1. Optimize new beam setup
2. Align diamond goni hoop parallel with chi plane to measure diamond offsets
3. Image diamonds

Useful Information

- Phone numbers
  - C1 hutch: 607-255-0256
  - Ken's office: 607-255-0914
  - Ken's home and mobile numbers can be found on a piece of paper hanging from the C1 computer monitor
- To edit an image in a terminal:
  - display *<filename>*.tiff
  - left click to open menu, click enhance -> normalize
  - click view -> resize -> change to 320x270
  - save -> *<filename>*.png
- To take a screenshot in Linux
  - Whatever window you want a screenshot of, make sure it is visible
  - open a terminal and type xwd > *<filename>*.xwd (xwd file type recommended)
  - The cursor should have changed to a plus sign. Click on the window you want a screenshot of.
- To open the ANDOR GUI
  - In the terminal type the command *andorview*
- Image directory and filenames
  - /home/specuser/Jones/Feb2016/pristine (our user directory)
  - /sambda.chessdaq/daq/current/c1/jones-73-1/pristine (CHESS local directory)
- [Richard's orientation presentation](#)

FourC Commands

Motor names

- *tth* - two theta
- *th* - theta
- *chi* - chi
- *phi* - phi
- *topsc* - flourescent top screen
- *spinz* - high of the hoop along the phi axis
- si331 - silican crystal

Commands

- *ad_lineup_on <time in second>* is the command to turn on the image updater
- *ad_lineup_off* is the command to turn off the image updater
- *tw <motor> <increment>* - tweaks a motor an increment from your current position
- *set <motor> <position>* - declares the current motor position
- *mv <motor> <position>* - moves a motor to a absolute position
- *wh* can be used to check the current values of all settings
- *newfile <filename>* - start a new file for each diamond. The filename should be the diamond name - diamond number - study1 (Ex. JD70-1-study1)
- *ad_on* is the command required before starting a scan
- *ascan <motor> <starting position> <ending position> <number of steps> <exposure time>*

Setup and Beam testing of pristine diamonds

February 18, 2016 [rtj, fmm, bjp]
We re-aligned the 3,3,1 silicon crystal with Ken's help and set up a sodium iodide photomultiplier aimed at the diamond to measure the backscatter from off the diamond. We ran a scan over a range of the 3,3,1 and found the peak in the count rate and set the 3,3,1 to this position.

JD70-113

JD70-113 is currently mounted in the CHESS mylar. We are running a test scan named JD70-113_setup to see how the rocking curve looks with the new beam setup and refresh ourselves with the commands. The goniometer has the following motor positions.

  tth = 0.7370
  th = 19.589 → 19.600
  chi = 88.72
  phi = 90

Running "ascan th 19.589 19.6 55 10", and then repeating to scan through theta for each orientation.
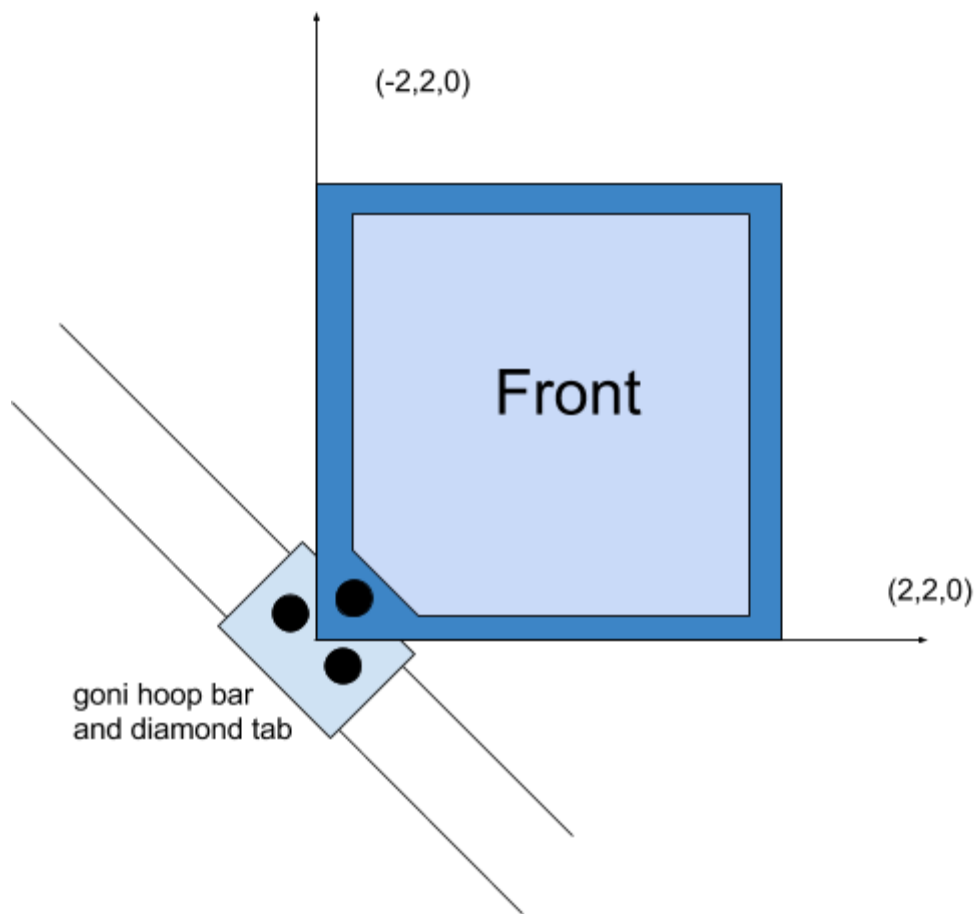
Figure S1. Cartoon depicting orientation chosen for mounting diamonds in the CHESS diffractometer. The cut surface faces front, facing the x-ray beam with the dog ear in the diamond's lower right corner (the incoming x-ray's lower left). The (-2,2,0) points vertical direction in this orientation. The uncut diamonds have a mark in the corner indicating where the dog ear will be cut when machined.

JD70-113

After the scan completed we increased the range to ensure total capture of the diamond's rocking curve. An example command used to do this is "ascan th 19.5865 19.5975 55 10".

Filename: JD70-113_scan1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-113_scan1_scan002	(2,-2,0)	Front	55	0.0002	10
JD70-113_scan1_scan003*	(2,-2,0)	Reverse	55	0.0002	10

JD70-113_scan1_ scan004	(2,-2,0)	Reverse	55	0.0002	10
JD70-113_scan1_ scan005**	(-2,-2,0)	Reverse	55	0.0002	10
JD70-113_scan1_ scan006	(-2,-2,0)	Front	55	0.0002	10
JD70-113_scan1_ scan007	(-2,-2,0)	Front	55	0.0002	10

* Scan was aborted because the ad_lineup_up mode was still enabled when it was started.
** Scan images are missing on disk, probably because ad_lineup_on was not turned off before the run was started.

JD70-114

[bjp night shift]

JD70-114 is currently mounted in the CHESS mylar hoop. The following scans were performed on this diamond in sequence without removing it from the mount.

Filename: JD70-114_scan	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-114_scan_ scan001*	(-2,-2,0)	Reverse	55	0.002	10
JD70-114_scan_ scan003	(-2,-2,0)	Front	55	0.0002	10
JD70-114_scan_ scan005	(-2,-2,0)	Reverse	55	0.0002	10
JD70-114_scan_ scan006	(2,-1,0)	Reverse	55	0.0002	10
JD70-114_scan_ scan007	(2,-1,0)	Front	55	0.0002	10

* Scan was completed over the incorrect range, leading in a resolution an order of magnitude too large.

JD70-116

JD70-116 is currently mounted in the CHESS mylar hoop. The following scans were performed on this diamond in sequence without removing it from the mount.

Filename: JD70-116_scan	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-116_scan_ scan004*	(2,-2,0)	Front	55	0.002	10
JD70-116_scan_ scan005	(-2,-2,0)	Front	55	0.0002	10
JD70-116_scan_ scan006**	(-2,-2,0)	Reverse	55	0.0002	10
JD70-116_scan_ scan007	(-2,-2,0)	Reverse	55	0.0002	10
JD70-116_scan_ scan008	(2,-2,0)	Reverse	55	0.0002	10

* The first 3 images may not have been saved because the ANDOR1:image window did not open.
** I did not have the camera contrast set correctly.

JD70-100

JD70-100 is currently mounted in the CHESS mylar hoop. The following scans were performed on this diamond in sequence without removing it from the mount.

Filename: JD70-100_scan	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-100_scan_ scan001	(2,-2,0)	Front	55	0.0002	10
JD70-100_scan_ scan002	(-2,-2,0)	Front	55	0.0002	10
JD70-100_scan_ scan003	(-2,-2,0)	Reverse	55	0.0002	10
JD70-100_scan_	(-2,-2,0)	Reverse	55	0.0002	10

scan005*					

* This scan had a mistyped range.

JD70-101

JD70-101 is currently mounted in the CHESS mylar hoop. The following scans were performed on this diamond in sequence without removing it from the mount.

Filename: JD70-101_scan	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-101_scan_ scan001	(2,-2,0)	Front	55	0.0002	10
JD70-101_scan_ scan002	(-2,-2,0)	Front	55	0.0002	10
JD70-101_scan_ scan003	(-2,-2,0)	Reverse	55	0.0002	10
JD70-101_scan_ scan004	(-2,-2,0)	Reverse	55	0.0002	10

The final orientation of this diamond is being scanned and the time is currently 5:45am. The beam is due to shutdown at 6:00am, good timing! Once this run is finished I will unmount JD70-101 and mount JD70-103. Over the course of the night I've gotten pretty efficient at getting the diamond centered and ready for a scan. This is the procedure I use.

1) mount the diamond in the hoop, use the metal bar hanging on the inside of the hutch to align the hoop plane with the chi plane.
2) put the fluorescent paper behind the diamond, close the hutch and open the shutters checking that the beam is centered on the diamond. Use si331 to move the beam up or down, use the translation stage the hoop is mounted to to shift the diamond into the beam left or right. You'll need to use the special screw driver.
3) put the fluorescent paper on the camera and look for the peak like usual.
4) Take the paper off, start ad_lineup_on and center the diamond. You can tweak si331 here to get an increase in intensity if you want.
5) Take your data. This is straightforward, but was the quickest recipe for getting scans done.
6) I also start with the diamond in the nominal (2,-2,0) position, then rotated in chi by 90 degrees and took the (-2,-2,0), then rotated in phi by 180 degrees to get the reverse of (-2,-2,0) and then swung back to chi = 0 degrees to get the reverse of (2,-2,0). Sounds

like a lot of chi moves, but it saves you a phi rotation which takes 5-10 minutes to complete.

JD70-103

February 19, 2016 [rtj, fmm]
Brendan mounted this new diamond in the Cline mylar hoop before he left last night. We aligned it at the chi=90 deg position and aligned it, then did the following scans.

Filename: JD70-103_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-103-study1_scan001	(2,2,0)	Front	60	0.0002	10
JD70-103_study1_scan002**	(2,2,0)	Reverse	60	0.0002	10
JD70-103_study1_scan003	(2,2,0)	Reverse	60	0.0002	10
JD70-103_study1_scan004	(-2,2,0)	Reverse	60	0.0002	10
JD70-103_study1_scan006	(2,-2,0)	Front	60	0.0002	10

** scan2 was aborted Andor1 was not updating the image.

chi = 90 deg position is defined as 12 o'clock while chi = "0" deg position is defined as 9 o'clock both positions are defined looking downstream.

Here we need a convention to decide which side of these pristine diamonds is the "front". We decided that the front side of the diamond is the one facing the side of the hoop with a long black line made with a pen marked along the side. Before the pristine diamonds are mounted in the hoop, Brendan marked them to represent the face and corner where the dog-ear will be located once the diamond is cut.

Aligning the UConn target hoop

February 19, 20:57 [rtj, bjp, fmm]
Having measured a good number of pristine diamonds, we now turn our attention to the thinned ones. Before we get started measuring rocking curves, we need to set up again our standard

procedure for aligning the hoop relative to the X-ray goniometer + beam coordinate system. We use the standard coordinate system for the mounting bar, as described in these drawings that we created during the February, 2015 run.

Ken Finkelstein has approved the following procedures for setting up the mounting hoop to record the goniometer offsets that place the diamond mounting bar in the standard position described above.

1. mount the UConn target hoop with the diamond cut surface facing the incoming beam
2. translate the mount vernier stages until the glass slide covers a 1mm disk at the center of rotation of the chi circle (use the view finder to ensure this)
3. move **tth** to 13.25 degrees (user units)
4. move **th** to 26.7 degrees (user units)
5. unlock the chi motor by loosening the chi gear engagement nut by 6 turns, reaching up and pulling the chi motor toward the south (the hutch door is on the south) until it comes out of engagement
6. turn the chi angle manually by pushing the phi carriage around the circle; do not push on the phi motor to turn it
7. shine the laser on the glass slide near the axis of chi rotation
8. rotate the chi carriage by hand and watch the reflected laser spot
9. adjust the tilt and phi of the mount until the spot stays still when chi is rotated through a full 180 degrees
10. move the chi carriage back to the 12 o'clock position (chi=90 degrees user) and re-engage the motor gear; the nut should tighten as many turns as it was loosened
11. use chi to micro-adjust until the diamond mounting bar is horizontal, using a level to set a reference
12. record the phi and chi (actually chi +/- 90 degrees to reach reference position) that put the bar in its reference orientation.
13. proceed with the rocking curve measurements.

This procedure needs to be repeated each time the hoop is removed from the 4-circle and mounted again. We mounted the JD70-117 crystal on the bar in the standard position, as shown in Fig. S1 above.

- bar at horizontal position (actual, when leveled): chi = 46.40 deg.
- bar in diagonal position (diffraction position, as in Fig. S1): chi = 91.40 deg.
- bar in vertical position (as in reference orientation): chi = 136.40 deg.

JD70-117

February 20, 2016 [rtj]

This diamond has been aligned to within 1mrad of normal to the chi plane of the 4-circle, and positioned with the bar at a known chi offset. I then did the following scans without touching the mount.

Filename: JD70-117_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-117_study1 _scan001	(-2,-2,0)	Front	533	0.0004	10
JD70-117_study1 _scan002	(2,-2,0)	Front	500	0.0002	10
JD70-117_study1 _scan003	(2,-2,0)	Reverse	500	0.0002	10
JD70-117_study1 _scan004	(2,2,0)	Reverse	525	0.0004	10

Before starting scan004 in the table above, I looked at the image of the expanded beam by resting a piece of fluorescent paper just behind the diamond. I noticed that the expanded beam spot seemed less intense than I remembered it and cutting off below the top of the diamond. I then put the fluorescent paper peeking up over the downstream end of the Si(331) crystal and saw that most of the incident beam was in fact going over the top of the Si(331) crystal. I slightly raised the stand on which the Si(331) crystal is sitting, until there was no more incident beam visible over the top of the Si(331) crystal. With the paper back behind the diamond again, I adjusted the si331 angle until the expanded beam was at a maximum intensity. It is now much brighter, and it fills the entire diamond frame, spilling over all of the edges. Now I do a scan of the diamond th angle with the paper back on the camera face, and see a much fuller topograph image, with the frame visible all around the perimeter of the diffracted diamond image. After this, I did a sweep to find the limits of the last scan above, and launched the scan.

After the final scan ended the alignment of the hoop was checked to see if there was any movement away from the original values. The laser reflected from the glass slide (at the center of rotation of chi) did not move from the original position, there was no change in phi or alpha required.

JD70-118

February 21, 2016 [fmm, bjp]

JD70-118 was mounted in the same orientation as JD70-117. The chi motor was disengaged and the glass slide was brought into the center of rotation. The reflected beam was checked again and as we rotated in chi, there was no change in the movement of the laser dot. There

was no change to the alpha or phi values. Then, the chi motor was re-engaged and the dial was set to 90 degrees. We moved the chi motor to 45 degrees so that the bar holding the diamond was horizontal. Then we used the auto leveler to cast a line of laser light across the bar and shifted chi until the bar was inline with the laser. The chi motor reading at the 45 degree position was 48.902 and the chi reading at the 90 degree position was 93.902 degrees. The si331 was adjusted using the motor labeled ccz only 0.5mm at a time until the beam was vertically in the center of the diamond. We started the first scan around 12:00pm.

Filename: JD70-118_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-118_study1 _scan001	(-2,-2,0)	Front	350	0.0004	10
JD70-118_study1 _scan002	(2,-2,0)	Front	375	0.0004	10
JD70-118_study1 _scan003	(2,-2,0)	Reverse	400	0.0004	10
**					

**scan003 was aborted

Fridah noticed that there was no light in any of the images during the middle of the scan, where the diamond should be at maximum intensity. We put the fluorescent paper back on the camera, located the reflection, and viewed it in lineup. Sure enough the diffraction pattern was slowly walking down the diamond as time went by. We tried shielding it with the kapton barrier, but that had no effect. I believe the diamond is not secured to the aluminum tab and that the epoxy is not holding the diamond rigid. There is nothing left to do but remove this diamond and proceed with another sample that will hopefully have a better bond. We will discuss with Dr. Jones what we should do with JD70-118, probably need to re-glue it. I just inspected the diamond as it was rotating back to phi = 270 and it has clearly shifted from where it started. Here is a sketch of an exaggeration of what I see.
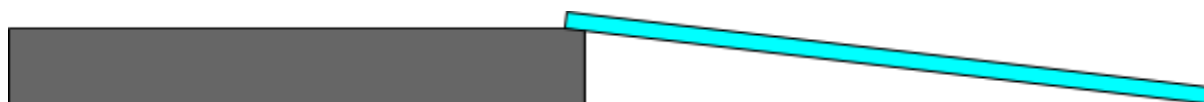
The product data sheet for Loctite 3888 recommends using heat to cure the epoxy, which I did not do when I first applied it. Perhaps we can salvage this glue by setting it on a hot plate for a few hours?

The diamond was studied under a microscope and I poked at the epoxy with a needle and it pushed right into it. It's basically just chewing gum at this point and the diamond was cantilevered over its point of contact on the tab.

JD70-111
February 21, 2016 [fmm, bjp]

Moving ahead with JD70-111. We mounted the diamond and re-aligned the hoop finding no new adjustments necessary for alpha and phi. This diamond was difficult to find a reflection for until we noticed that in the chi = 45 degree position, the diamond was still tilted in chi. After adjusting the diamond an additional +3 degrees in chi we were quickly able to find a reflection that did not shift when viewed by the andor camera. The chi offset to level the bar was 93.8 degrees,

Filename: JD70-111_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-111_study1 _scan001*	(2,-2,0)	Front	675	0.0004	10
JD70-111_study1 _scan002	(2,-2,0)	Front	675	0.0004	10
JD70-111_study1 _scan003	(-2,-2,0)	Front	400	0.0004	10
JD70-111_study1 _scan004	(2,2,0)	Reverse	400	0.0004	10
JD70-111_study1 _scan005	(2,-2,0)	Reverse	750	0.0004	10

*scan001 was aborted

February 19, 2016 [rtj]
I took over the night shift around 11:00 pm from Brendan and Fridah, and finished the set of scans that they started of JD70-111 in the table above. I ran out of things to do during the night, so I decided to just launch a long run for the last scan (scan005) and leave it running. I went back to the hotel to get some sleep at around 4:30, when the scan was about half-way through. The images look fine on the screen, so I think everything is working well. In order to get the crysal aligned for scan004, I did have to ask the operator for permission to shift the chi limits by a few degrees. It seems that the gluing job of JD70-111 onto its tab left something to be desired in terms of the alignment because the chi is offset is huge, around 10 degrees. Most of this is coming from the misalignment between the mounting tab and the crystal, not between the crystal axes and the crystal edges.

When they get in for the morning, Brendan and Fridah will finish the task of unmounting those diamonds that were unsuccessfully glued to their mounts, and will attempt to remount them on the tab fixtures. One guess for why several of them seem loose is that the thermal epoxy never actually hardened. This might be because the epoxy batch was bad, but more likely it is because the mixing between hardener and resin was incomplete when it was applied to these diamonds. I hope that the second attempt will be more consistently solid. I think we probably will need to use heat this time around to accelerate the curing of the epoxy, otherwise we might run out of time before we have had a chance to measure rocking curves for all of them.

JD70-118 (take 2)

February 21, 2016 [rtj]

JD70-118 was mounted again (after regluing) in the same orientation as before. The chi motor was disengaged and the glass slide was brought into the center of rotation. The reflected beam was checked again and as we rotated in chi, there was no change in the movement of the laser dot. There was no change to the alpha or phi values. Then, the chi motor was re-engaged and the dial was set to 90 degrees. We moved the chi motor to 45 degrees so that the bar holding the diamond was horizontal. Then we used the auto leveler to cast a line of laser light across the bar and shifted chi until the bar was inline with the laser. The chi motor reading at the 45 degree position was 48.7 deg and the chi reading at the 90 degree position was 93.7 degrees. This time I did not see any reason to adjust the ccz motor, as the beam spot at the diamond seemed to be well centered. After setting the diamond orientation for the first scan in the table below, I tweaked the si331 to get as uniform an intensity profile as I could over the surface of the diamond, as seen in the camera image for a th setting near the center of the whole-crystal rocking curve. I believe that the coverage is good enough to see the frame around all four sides of the crystal at some point in the scan. I am starting over again with crystal JD70-118.

February 21, 8:00am [fmm, bjp]

Filename: JD70-118_study2	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-118_study2 _scan001	(2,-2,0)	Front	450	0.0004	10
JD70-118_study2 _scan002	(-2,-2,0)	Front	420	0.0006	10

JD70-118_study2 _scan003	(2,2,0)	Reverse	450	0.0004	10
JD70-118_study2 _scan004	(2,-2,0)	Reverse	484	0.0006	

JD70-119

February 21, 2016 [rtj]

JD70-119 was mounted again in the same orientation as usual, with the front face of the diamond facing in the upstream direction. The chi motor was disengaged and the glass slide was brought into the center of rotation. The reflected beam was checked again and as we rotated in chi, there was no change in the movement of the laser dot. A small adjustment was needed to the phi angle in order to reduce the motion of the reflected spot to about the radius of the spot at the wall, a total distance of approximately 2m from the glass slide. Then, the chi motor was re-engaged at the dial position 90 degrees. We moved the chi motor to 45 degrees so that the bar holding the diamond was horizontal. Then we used the auto leveler to cast a line of laser light across the bar and shifted chi until the bar was inline with the laser. The chi motor reading at the 45 degree position was 48.7 deg and the chi reading at the 90 degree position was 93.7 degrees. As soon as we were able to align the diamond and make sure the beam spot was well centered, we started a new set of scans of JD70-119.

Filename: JD70-119_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-119_study1 _scan001	(2,-2,0)	Front	700	0.0005	10
JD70-119_study1 _scan002	(-2,-2,0)	Front	650	0.0004	10
JD70-119_study1 _scan003	(2,2,0)	Reverse	650	0.0004	10
JD70-119_study1 _scan004	(2,-2,0)	Reverse	700	0.0005	10

JD70-120

February 22 at 7:00 [rtj]

Finished the scans of JD70-119_study1, time to switch out the diamond. Brendan has laid out a new one for me to install, I think called JD70-120. I moved the phi angle back to the "forward" orientation and swapped out the bar holding JD70-119 for the bar holding JD70-120. I disengaged the chi motor and aligned the laser on the center of rotation as viewed by the spot on the glass. I had to advance the radial screw on the chuck mount to get the spot on the glass slide. When I did that and rotated the chi stage manually by 180 degrees the reflected laser spot on the wall did not move by more than the width of the spot. Finally, I re-engaged the chi motor and then used the laser level to bring the bar into horizontal orientation. The chi value that accomplished this was 48.6 degrees. I then put the th and tth motors back to nominal positions for diamond diffraction and moved chi to the 93.6 degree position to start a new set of scans. By the way, while I was mounting this diamond, I had a look at the reflected image from the polished side of the diamond, and this one looks visibly warped, with cracks along one full side and half way down the two adjacent sides. I am not expecting this diamond to look very nice in the rocking curve image.

It was difficult to find the diffraction peak in this diamond because it was so far off the nominal direction, peaking around th=23.4 degrees. It is also very wide, as I predicted based on the bending I could see in the back-side reflection. I will not want to spend too much time on this diamond, as it will not be very useful for GlueX. I will do each scan twice, once with a smaller step size and once with a very large step size that allows me to cover the full width of the rocking curve.

Filename: JD70-120_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-120_study1 _scan001	(2,-2,0)	Front	100	0.0150	10
JD70-120_study1 _scan002	(2,-2,0)	Front	100	0.0003	10
JD70-120_study1 _scan003*	(2,-2,0)	Front	100	0.0003	10
JD70-120_study1 _scan004	(-2,-2,0)	Front	100	0.0150	10
JD70-120_study1 _scan005	(-2,-2,0)	Front	200	0.0003	10
JD70-120_study1 _scan006	(2,2,0)	Reverse	100	0.0150	10

JD70-120_study1 _scan007	(2,2,0)	Reverse	200	0.00035	10
JD70-120_study1 _scan008	(2,-2,0)	Reverse	100	0.0150	10
JD70-120_study1 _scan009	(2,-2,0)	Reverse	200	0.00035	10

* extending the range of scan002 to cover more of the diamond surface in the topograph

The final scan of JD70-120 is almost complete and we will mount JD70-112 as soon as it's finished. Once we find a peak Fridah and I will grab a quick bite to eat while the run completes.

JD70-112

February 22 at 1430[bjp,fmm]

JD70-112 was mounted to the metal hoop and using the auto-leveler we found the chi reading at the 45 degree position to be 48.7 degrees and 93.7 degrees at the 90 degree position. We created a new file, found the reflection and started a longer run while we went to get lunch.

Filename: JD70-112_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-112_study1 _scan001	(2,-2,0)	Front	475	0.0004	10
JD70-112_study1 _scan002	(-2,-2,0)	Front	368	0.0008	10
JD70-112_study1 _scan003	(2,2,0)	Reverse	368	0.0008	10
JD70-112_study1 _scan004	(2,-2,0)	Reverse			10

JD70-108

February 22 at 22:30 [rtj]]

JD70-108 was mounted in the original CHESS mylar hoop because he is not yet glued to a metal tab. This diamond has been milled, but not all the way to 20 microns.. The inner thin

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region is currently around 90 microns thick. It is interesting to see what the shape of a diamond is having been laser ablated down to a thickness of around 100 microns.

Filename: JD70-108_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
JD70-108_study1 _scan001	(2,-2,0)	Front	425	0.0002	10
JD70-108_study1 _scan002	(-2,-2,0)	Front	225	0.00024	10
JD70-108_study1 _scan003	(2,2,0)	Reverse	300	0.0002	10
JD70-108_study1 _scan004	(2,-2,0)	Reverse	400	0.0002	10

The results for JD70-108 are especially interesting. What they tell us is that laser ablated diamonds have large internal strain, even when they are very thick. This is consistent with what we saw when we looked at some early virgin 3x3mm^2 samples from E6 that had been polished on only one side. There was a consistent bowing effect coming from the asymmetry in the surface quality between the two sides of the crystal. This is what we seem to be seeing here once again. Very interesting, there will be much more to be learned about this from these data. Meanwhile, on to the last sample.

ANL3x5

February 23, 5:03am [rtj]
I took down JD70-108 from the CHESS mylar hoop and installed Yuri Shvydko's sample in it. The sample was mounted with the diagonal cut corner in the upper right when looking at the hoop from the side with the UC-30 writing on it. Everything about the orientation can be observed by looking at the topograph images so I do not need to be more specific here. I adjusted the mount to put the sample at the center of rotation and tweaked the expanded beam to extend outside the diamond area around all four sides. It was very easy to find the reflection. I took a full set of 4 scans. These are very clean scans. In fact, I think they tell us more about our beamline resolutions than they do about the sample, so they will be very useful for that purpose.

Filename: ANL3x5_study1	Orientation	Front or Reverse?	Steps	Step size (degrees)	Exposure (s)
ANL3x5_study1_scan001	(2,-2,0)	Front	70	0.0002	10
ANL3x5_study1_scan002	(-2,-2,0)	Front	75	0.0002	10
ANL3x5_study1_scan003	(2,2,0)	Reverse	75	0.0002	10
ANL3x5_study1_scan004	(2,-2,0)	Reverse	100	0.0001	10

A successful end to the run, last scan ended just 10 minutes before beam was shut off. It was a good run, many thanks to Fridah and Brendan for working overtime to make it happen. Now we need to get busy analyzing these data and publishing results.

Cleaning up

February 23, 2016 at 7:20am [rtj]
I took the ANL3x5 sample out of the mylar hoop and returned it to its box. The mylar hoop I left on the table just outside the door to the hutch. I am leaving the diamonds collection and assortment of tools and materials that we brought with us for Brendan to gather up and pack out. All of the data has now been shipped to UConn for archiving and offline analysis. I am leaving the images data (168 GB) in the /samba/chessdaq/daq/current/c1/jones-73-1 directory in case there are things in there that Ken might like to take a look at. I wrote him an email and told him to delete everything in that directory at his discretion.

Now doing the exit user survey, returning my badge + access card + parking pass, and saying goodbye. It was a good run.