

November 9, 2021

Needle alignment in the center of the diffractometer

Goal: find the center of the diffractometer and mark it on the monitors. No beam required for this alignment.

1. Place the needle in the goniometric head in the phi stick. Make sure the needle is flush with the bottom of the insert in the gonio head.
2. Center all the translations (x2) and all the arcs (x2) of the goniometric head. They will stay centered from now on.
3. Convenient: bring your laptop inside the hutch to move the motors while looking at the diffractometer. This allows you to quickly stop motions if you see a collision about to happen.
4. Properly align the sample camera to look at the needle. It is underneath the diffractometer upstream bench. Set monitor on the optical table where you can see it.
5. Rotate phi (not omega) relative 180 degree back and forth. At every step, mark the needle position in the monitor. Then use the diffractometer sample motorized translation (X or Y), to bring the needle to the center position.
6. Repeat the phi rotation relative 180 degree back and forth to confirm that the needle position does not change at these two positions.
7. Move phi relative 90 degree.
8. Repeat steps 5 and 6, correcting the corresponding sample motorized translation (Y or X), to bring the needle to the center position.
9. At the end of steps 5 to 8, the needle rotation axis is corresponding with the diffractometer phi axis. Good!
10. We are now going to fix the sample height z, by moving between chi 0 and chi 90, and adjusting sample z until the tip of the needle is at the same spot for both. Previous recorded z value was 2.6575.
11. Record the needle position with a clear spot in the monitors inside and outside the hutch.
12. If one single z value does not succeed having the tip of the needle at the same spot for both chi 0 and 90, log this in detail (two spots, who is who, and z values for each). This speaks about the diffractometer sphere of confusion.