BL8.0.1.1 iRIXS Sample Positioning using alignment lasers

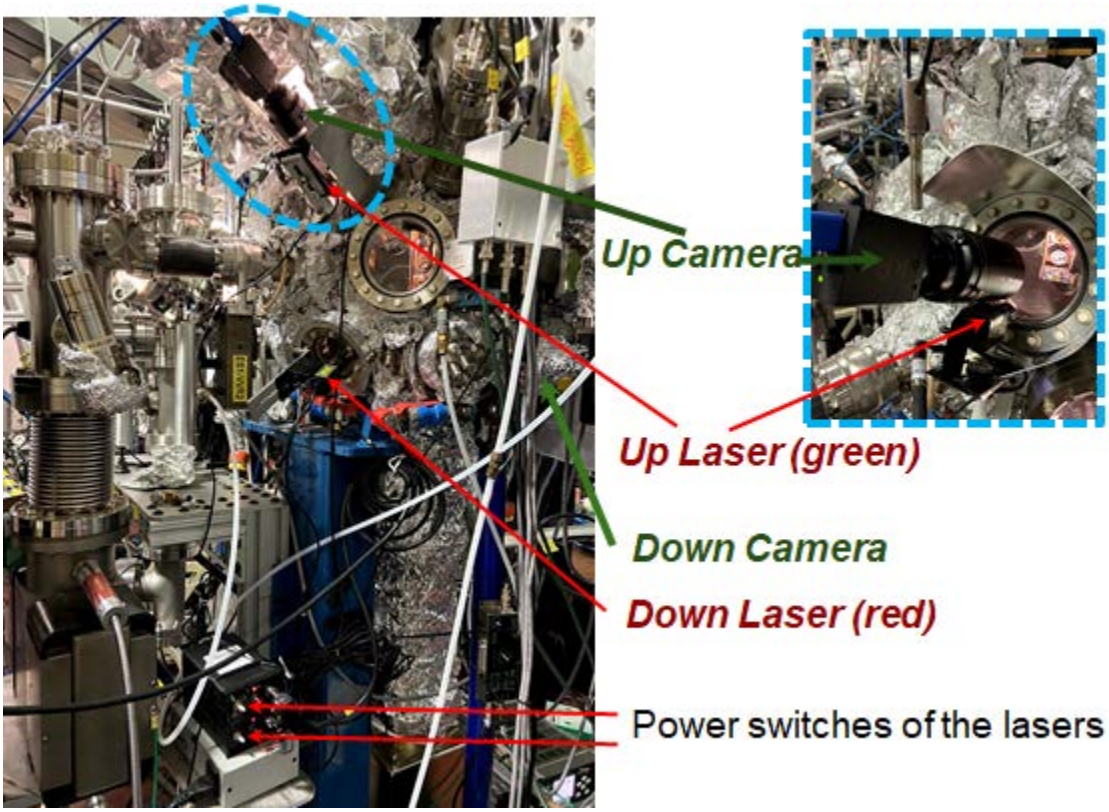
-Suggestions? Please email Wanli Yang (WLYang@lbl.gov) - Ver. *07/2020*

***DISCLAIMER**: A synchrotron beamline is NOT something one could operate by just reading through a manual. Anyone operating a synchrotron beamline should have some sort of OJT. Reading this manual does NOT automatically authorize anyone to operate any synchrotron beamline. The purpose of this manual is for providing a reference, a reminder, or a general guideline for users who know what they are doing.*

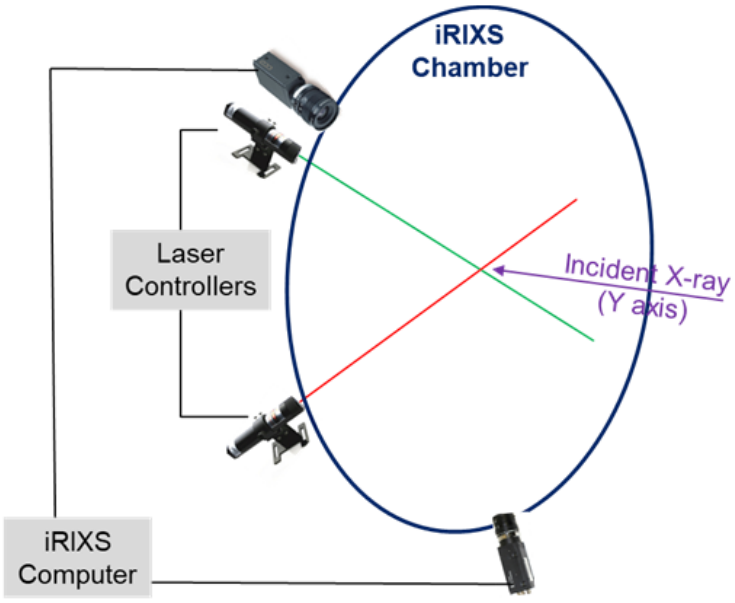
As of Jul 12, 2020, two Class 3A lasers, one red and one green, have been setup to the iRIXS endstation, pointing towards the sample/beam spot.

NOTE: please do NOT touch the laser covers and cables! Any change on the laser angle will require a new alignment.

The locations of the i) 2 alignment lasers, ii) 2 Cameras, iii) 2 laser controllers, are shown in the photo below:



The schematic below shows the mechanism on sample positioning using the 2 alignment lasers. The crossing point of the two alignment laser beam defines the beam spot with visible light.



A routine procedure:

1. **Make sure the manipulator is moving within a safe range so the cryostat will not crash into the chamber wall (X/Y zero is around the center)**.
2. Turn both lasers on (see controller locations in the photo above)
3. Move X and Y so you will see the two lasers hit a single spot on your sample holder (you will see easily the two spots are separating or merging while moving along different directions) - this is where the beam will hit on your sample holder.
4. Move Z (vertical) to the vertical level of the sample you would like to measure. This does not affect the alignment as it's perpendicular to the X-ray beam.
5. Move X towards the sample you would like to measure, you will see the two laser spots start to separate.
6. Move Y (along X-ray beam) to let the 2 laser spots merge - again, this is where the beam will hit.
7. Repeat 4 & 5 until the merged laser spot is on your sample.
8. You are ready to collect data or record the sample XYZ positions for remote experiments.

Two quick video demonstrations: (Note the angles and colors in the software have been corrected as of July 14th, 2020)

https://youtu.be/EC9hqFgSxXU (by on site looking into chamber)

https://youtu.be/rFvEQazk8as (all through iRIXS computer)