ALS-COLTRIMS Plan:

Beamline 11

Follow these steps:

1. Take care of the beamtime preparation checklist first: http://amo-csd.lbl.gov/downloads/Checklist%20for%20Beamtime.pdf

2. Finish building the spectrometer (meshes, feet, resistors, cables, etc.)

3. Get the telescope and the right stand (reserve the stand with a note!!!)

4. Put MCPs on detectors and detectors on spectrometer. Figure out the length of the cables going from the detector to the chamber feedthroughs (MCP rings may need to be rotated since cables are as short as possible).

5. Disconnect some of the foreline hoses.

6. Put forepumps on pallet jacks (no need to lift them by hand).

7. Disconnect the beamdump. Cover the ends with CF plastic protectors and aluminum foil. Put the beamdump support stand on a cart.

8. Fill up the red KF equipment box (copper rings, O-rings…).

9. Put boxes (lemo, SHV, BNC cables, KF equipment) on a cart. There is no need to bring the following boxes: Lab jacks, powercords.

10. Put beamdump + regulators in LBL cardboard boxes and on a cart.

11. Put water and vacuum hoses in LBL cardboard boxes and on cart.

12. Put exhaust hoses in LBL cardboard boxes and on cart.

13. Put the three blue car jacks on the pallet jack tray and bring the transfer plate box as well. **Note:** the box is quiet heavy.

*__left:__ examples for available jacks, transfer plates, and dollies. __right:__ the pallet jack tray (find it in 2-123)

14. Take out the earthquake brackets at the controller cart and the chamber

15. Take out the crane and the Aluminum support block of the crane stand and bring the crane stand up while loosening the bolts at the crane post.

16. Lower the controller cart and the chamber and move the feet all the way up. Get the controller cart out of the lab and park it in the hallway (lower the feet to secure it).

17. On BL 11 get the beamline scientist to move the platforms out of the way.

18. The footprint of the COLTRIMS setup at BL 11 should look like this: http://amo-csd.lbl.gov/downloads/BL11_LAYOUT.pdf

19. Move the chamber to the beamline very slowly and carefully (consider using a pallet jack) but don't put it in position just yet.

20. Setup and align the telescope to the photon beam (choose enough space between the beamline and the position of the scope so that the chamber fits in between and leaves a walkway). Assume an angle of the beamline of 3deg.

21. Move in the chamber (you may find old sharpy marks on the floor). Bring in the 3 blue car jacks from 2-102 with the pallet jack tray in 2-123 (loading dock). Slowly lift the chamber with these jacks – lower the four chamber feet while doing that. Once you have reached the appropriate height and incline

(3 degrees) stop and put the big transfer plates under each foot one by one. Now move the chamber closer to the beamline and in a way that the beamline bellow and the entrance of the differential stage line up. Fine tune the position according to the telescope. The reference points are the entrance and exit of the little tube inside the differential stage. Once you are happy with the alignment put the 4 red scissor jacks under the chamber frame and lift the chamber just very slightly so that you can take out the transfer plates one by one and lower the feet to the ground (you may have to put some blocks under the scissor jacks in case the chamber is jacked up high). Check again with the telescope. In best case the pre-aligned chamber and differential stage fit right in. However, you can readjust the height while using the 4 feet of the chamber and the left/right platform screws. **Note:** Don't forget to loosen all locking screws on the chamber and differential platform **AND** open the left/right adjustment screws on the differential stage as well ! Do not try to move the chamber frame with a hammer banging at the feet – you may use an 8020 or unistrut bar as a lever.

22. Install the beamdump in a straight way and adjust the support post. The crude alignment should result in a straight line, i.e. if the bellow between the differential stage and the beamline shows an s-curve something is wrong.

23. Clamp down the chamber with the earthquake brackets. If you don't find threaded holes in the ground inform the beamline manager and Monroe Thomas to drill these holes for you.

24. Ground the chamber. Make use of the ground-extender.

25. Bring in the jet forepump. Find the Aluminum 3-step ladder from the ALS (there is one leaning against the hutch at the aisle between BL 10 or 11 or go around the ring and in building 7 to find and borrow it). Put it over the forepump. Make the KF connections: Use the right KF hose (do not change any KF crosses at the turbo) – it should go under the frame (that's important to install the Helmholtz coil later).

26. Put in the spectrometer with the detectors VERY VERY carefully (it will be heavy).

27. Connect all the wires to the flanges according to the Roentdek webpage or the logbook. **Note:** Make sure the wires with High Voltage are not going parallel with any other wires or any signal wires comes too close to the chamber walls. Shorten the wires if necessary.

28. Find the overall alignment using the left/right platform screws of the chamber. The center of the spectrometer should be 1 to 2mm above the photon beam.

29. Mount all the phosphors and adjust them and check their motion pathways. Make sure the phosphor points towards the photon beam.

30. Install the slits in the back and in the front (they should go in that far that they just cover the copper plates of the spectrometer leaving something like an 8mm gap).

31. Connect the differential pumping stage to the beamline. Close the valve and start pumping with the orange drytel (the turbo pump and the ion gauge on the differential stage should be off for now). The beamline turbo pump cart may be attached to the beamline or not.

32. Put down the crane post. Put the special aluminum block under the post (2-102) and install the crane.

33. Recheck all connections and take a picture of the inside of the chamber, in particular of the wiring of the detectors and spectrometer.

34. Close the chamber, i.e. put the lid on and connect the foreline hose.

35. Bring in the other forepumps and the drytel. Connect all the KF hoses and also the exhaust hoses.

36. Bring in the controller rack and put it behind the crane post and next (left) to the beamdump pipe. The front panels should face the beamdump. Connect the cables to the gauges and turbo pumps. The controller rack needs to be seismically secured as well – use the provided bar and threaded rods. Monroe Thomas may need to drill taped holes in the floor (make that happen).

37. Ground the controller rack.

38. Mount the Helmholtz Coil arms.

39. Mount the Helmholtz coils and connect them to the big powersupply. **Note**: The electric power cables should go over the beamdump pipe to support the weight which helps to reduce the strain on the electrical connection. The same is true for the water hoses. Ground the Helmholtz powersupply cart first.

40. Pump down the setup (close all foreline valves, open all bypasses, close the vent valve, start the forepumps, open the valve on the source foreline slowly while watching the manometer, after a while open the valves on the other forepumps slowly as well, start the turbos, once all turbos are on full speed start the ion gauges – if an ion gauge won't start it's likely that the connector has to go in another position).

41. Bring in the electronics rack. It should go to the right of the gas manifold and the Helmholtz Coil. The electronic rack needs to be seismically secured as well – use the provided threaded rods. Monroe Thomas may need to drill taped holes in the floor (make that happen).

42. Ground the electronics rack.

43. Hook up all SHV cables and decoupling boxes. Make use of the fork clamps on the CF2.75 flanges to support the decoupling boxes. Ground the decoupling boxes with the green grounding cables. Connect the lemo cables. Perform a detector test if the vacuum is better than 1E-6mbar. **Note:** The spectrometer needs a decoupling box too. **Note:** The walk level on the CFDs needs to be adjusted that way that the zero is slightly above the baseline.

44. Bring in the acquisition computer. It should go to the right of the electronics rack. **Note:** Store the data on the RAID system (not the local D-drive)

45. Get a LN2 dewar and the right PPE for the coldtraps.

46. Find a good place or a stand to install the gas bottle (bottle may need to go into gas cabinet). Tie the bottle down on the top and on the bottom.

47. Install a copper or stainless steel gas line and perform a vacuum leak test.

48. Put a fan next to the gas regulator in case flammable gases are used.

49. Perform a jet test (connect gas bottle, pump out the lines, close all bypasses).

50. Clean up the place for the upcoming safety inspection (avoid trip hazards, make everything earthquake safe, check groundings, check the exhaust system…).

51. wait for the photon beam and consider doing the crude alignment with the transfer plates while looking at the phosphors (first align the telescope and then move the chamber). Use the chamber plate motion for fine tuning. **Note:** Do not forget to loosen the bolts **AND** adjustment screws at the chamber plate **AND** the differential stage.

52. ask the beamline scientist for an absolute photon energy calibration

53. use the RAID system to store all data.

54. try to set the magnetic field to the approximate value with the powersupply. Then use a low electric field and rather low energy photo electrons to see 2 to 3 wiggles.