

General remarks regarding ALS robot system:

Preparing pucks at home.

a) Preparing pins:

- for ALS pucks use ONLY the special Hampton pins or spine pins
- break off the 2 bottom sections of the standard Hampton pin to obtain the right length; pin should stick out 12-13 mm from the top of the cap
- use superglue to connect the pin to the cap, put glue at the end of the pin and push it all the way to the bottom of the hole in the cap
- let the glue dry out before freezing, it won't work properly if you freeze liquid glue
- make sure you have glue only around the pin and not on the cap sides or its bottom
- to check if the glue holds, try to pull out pin by hand, it shouldn't come out.
- check the length of all your new pins by placing them on one surface and comparing their length, discard the ones which are too short or too long.

b) Loading puck:

- put a puck with holes up into a small LN2 dewar and stabilize its temperature at -180degC using magnetic wand holding the pin with mounted crystal insert it straight into the puck by pushing the spring tensioned plunger
- do not work with too icy magnetic wand since that introduces ice particles stuck to the bottom of the cap
- keep track of every crystal and its position in your database
- if the crystals are not going to be mounted by the robot, close the puck with the non-magnetic lid, otherwise use the magnetic base.
- hold the magnetic base with the base holder tool and push the base into the puck
- be careful, that once center pin of the base is in the puck properly oriented, you push immediately in without picking the caps up and pulling them out of the puck.
- be sure you hear the snapping sound of the base being clamed by the springs on the puck when closing the puck with the base.
- a cold closed puck should be handled with the puck tongs.

c) Loading/Unloading Pucks into/from CP100 dewar:

- to **start loading** an empty puck carrier put it first into the CP100 and let it cool down.
- once it's done, grab the ready puck in LN2 with the puck tong, the magnetic base
- on top (X_tals are 'hanging' vertically inside of the puck) and the indexing groove located opposite from the puck tong
- lift the carrier out of the CP100, but leave ~1" of it still in the dewar
- push the puck carrier into the carrier until it snaps in, sitting completely flush with the carrier

- to **unload a puck**, pull the carrier out of CP100, leave ~1” of it in the dewar, release the safety rod, and grab the puck with the puck tong and slide it out of its location, putting it immediately into a small dewar with LN2. For **transportation secure the pucks in the carrier with the safety rod** again.

IMPORTANT: Before cooling down any robot parts, make sure they are completely dry. Water turning into ice at LN2 temperatures acts like glue between 2 metal surfaces.

ALS/UNI puck preparations for load into the ALS robot dewar:

- take the puck out of the carrier and soak quickly in LN2; holding it with the puck tong,
- inspect once again for small objects possibly attached to the magnetic puck base,
- remove anything what's visible to your eye, including ice particles!
- if you don't have ready LN2 bath for the puck and you take out your puck from the holder on the beamline bench, with the magnetic base up, you'll see temperature fall off inside of your puck as shown in Fig.1. If you place the puck with the magnetic base down you have only ~1.5min to bring the puck into LN2 bath.

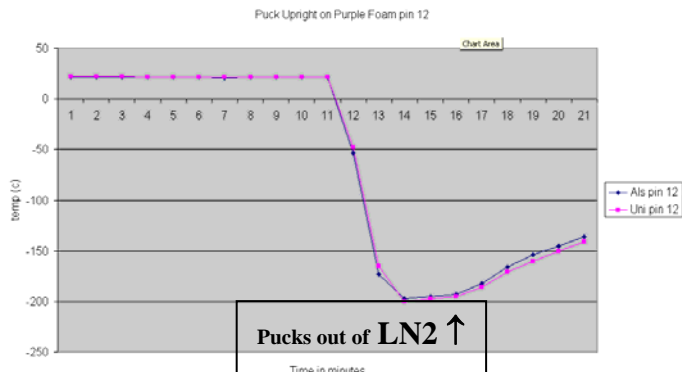


Fig. 1 Puck cooling down and warming up

- prepare the robot dewar for puck loading at a given aligned robot location (positions A-F), by clicking from BOS interface CENTER page, first **“Load”**, than for example ‘Select Puck’ **“A”**, ‘Select Pin’ **“center”** (Fig. 2). Once the interface shows you that the chosen position was reached, enter the hutch and open the small lid of the robot dewar (Fig.3) in order to start loading.

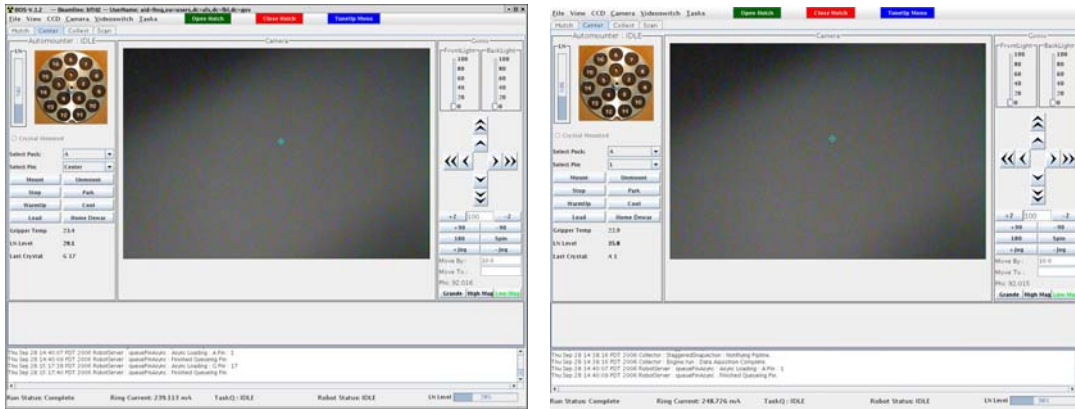


Fig.2 BOS gui, CENTER page, puck A centering (left), positioning on pin 1 (right)

- holding the puck in small dewar, screw the puck separation tool (pusher) into the puck lid
- Take the puck out of LN2, bring it near the open small lid of the robot dewar, rotate the indexing groove of the puck lid towards the mark on the surface of the big dewar (Fig 4.) and move it down, until you feel, that the puck slides along the alignment post all the way down onto the bottom of the dewar puck plate (Fig. 5).

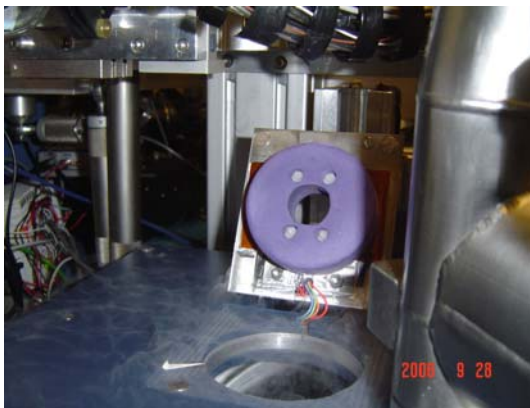


Fig.3 Open Small Lid

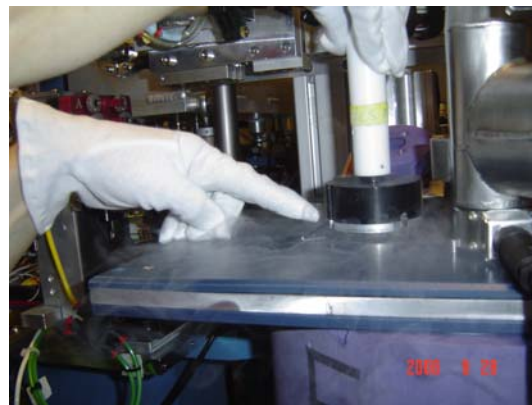


Fig.4 Position the puck over small lid opening

- **good alignment of the indexing groove of the puck with the indexing post of the puck mounting base in the dewar is essential**; try sliding the groove gently along the post until you reach the bottom and ‘feel’ that you are not able to rotate the puck unit any more; only then **push the rod and pull the pusher in the same time in order to separate the puck from the base** and leave just the base alone with all the samples inside of the dewar (fig.5).

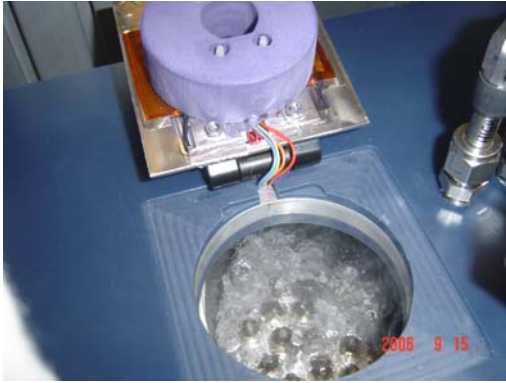


Fig. 5 Loaded puck in ALS dewar

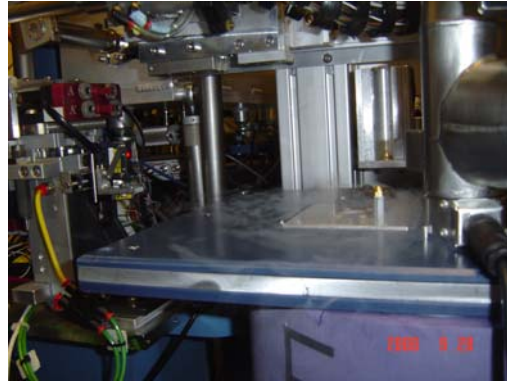


Fig. 6 Closed lid after loading pucks.

- check visually if all pins are there and proceed to your next puck starting with the first point of this paragraph.
- In case you are done, close the small lid (Fig. 6) and start your screening by choosing for example the puck “A” location and pin 1 from “Select Pin” scroll bar in BOS gui (Fig. 2 right). Follow up with BOS manual for screening with **WebIce**.

ALS/UNI puck transfer out of the ALS robot dewar.

- Prepare small dewar with LN2 and cool down the puck separation (pusher only) tool attached to the lid of your puck
- Once the lid and the tool are cold, bring everything near the robot dewar, open small lid, take out the cold pusher with the puck lid and align them so, that the indexing groove of the lid points towards the white/red indexing mark on the big dewar lid (Fig. 7)
- Slide the cold lid along the post until you reach the puck base, hear the snapping sound of the base being clamed by the springs on the puck when closing the puck under LN2 and ‘feel’ that you are not able to rotate the puck unit any more
- **Tilt slightly the pusher and so the puck by ~15deg** from vertical towards or away from you and quickly take it out of the robot dewar into your small transfer dewar. (Fig. 8)



Fig. 7 Inserting puck lid into the dewar

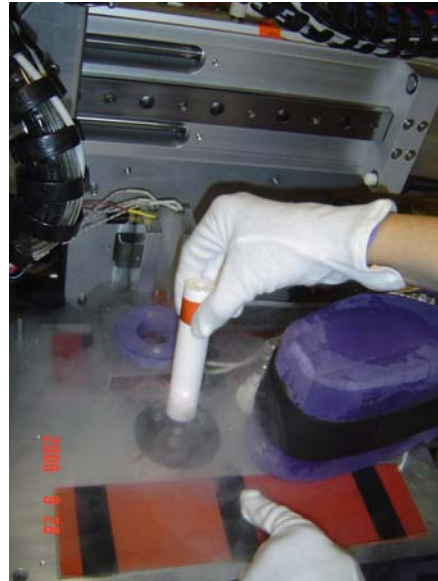


Fig. 8 Taking puck out of the dewar

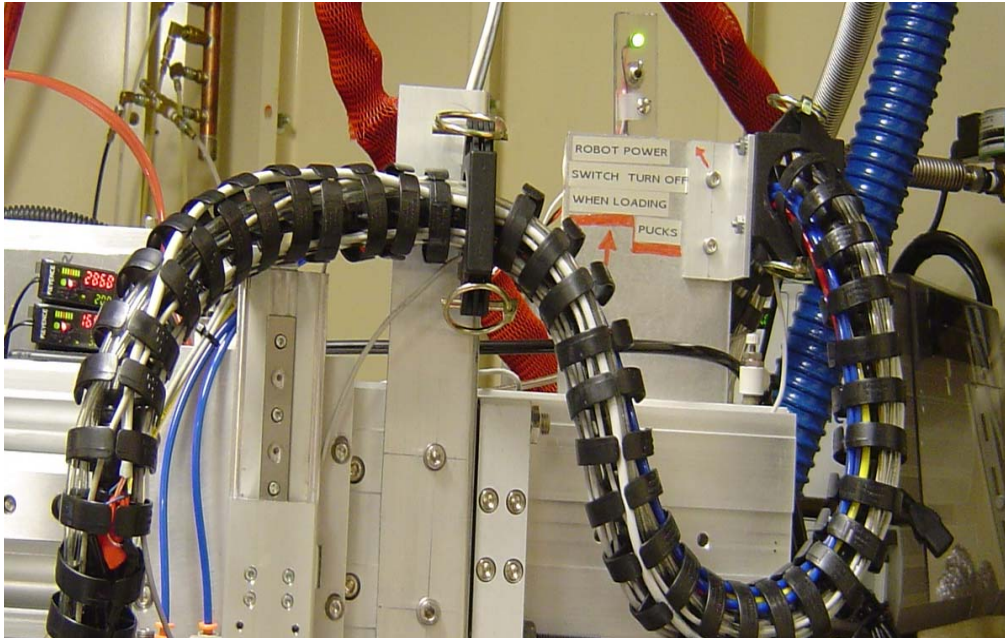
- If you are done with measurements, close the small lid and warm up the gripper for the next user (by pressing ‘Warmup’ from the Automounter page of the BOS gui).

IMPORTANT SAFETY RULE:

While loading the pucks never allow anyone else sending commands to the robot.

To make it safe, before loading your pucks, toggle the ‘OFF’ switch on the panel shown below in Fig. 9 (green light is off). After you are done, toggle the switch back into the ‘ON’ position (green light comes back on).

That allows you to continue moving robot from the BOS interface.



d) ALS Puck maintenance guide:

- never expose the ALS style puck bases to temperatures above 100C, i.e. don't use the red heating gun to dry pucks out.
- always inspect the puck base before starting loading your samples!
- in particular, check if the puck base is undamaged, the base magnetic surface not cracked, screws tight fit to the puck body, the aluminum walls of the puck base not bent, puck springs intact, etc.
- try to avoid ice during loading your samples into the puck.
- when preparing for trip, once your puck holder is filled and ready for shipment,

NEVER forget to insert the long safety rod to secure safe transportation of all the pucks within the carrier holder.