Instructions for turning on and off the NIKA cryostat

The NIKA cryostat can be remotely controlled from Grenoble, provided that the pumping system is correctly connected to the internet and that is powered. In this case, only a few minor interventions are needed from the staff on site. In this document I am assuming that this is the case. If so, please follow the instructions below:

To turn on:

1) Connect the leak detector to the cryostat. The tombak must be connected to the flange indicated by the red arrow in picture **1**.
2) Switch on the leak detector and start pumping on the tombak by pressing the 'cycle' button when the leak detector is ready (picture **2.** Actually, I forgot to take the picture so the image was taken from the web...).
3) After vacuuming the tombak, press once again on the 'cycle' button to pause the pumping process. This is to prevent problems to the leak detector pump if for some unexpected reason the vacuum in the cryostat has been lost.
4) With the leak detector in pause, *open the manual valve* indicated by the green arrow in picture **1**.
5) Now restart the leak detector by pushing once more the 'cycle' button.
6) If there have not been problems, the vacuum should still be relatively good. **Please note the value of the pressure at this point !** Leave the leak detector pumping during all the cooldown stage.
7) Dip the nitrogen trap (picture **3**) in a dewar full of liquid nitrogen (picture **4**). The nitrogen trap should have been left vertical after the previous cooldown (see point 6 of the turn off procedure).
8) Now the system is ready to be taken over remotely. Someone from the NIKA team will start to make a series of tests to verify that the whole pumping system is working correctly and that there are no leaks on the circuit for the 3He/4He mixture. This step could take something like 15-30 minutes.
9) Once all the tests for leaks are done, the NIKA team will give the 'green light' to open the mixture reserve.
10) **When the NIKA team gives the green light, *open the manual valve on top of the mixture container*** (picture **5**, green arrow). The container is located in the receiver cabin, a bit 'hidden' on the right (picture **6** and **7**).
11) Once again, more tests will be done remotely to check that the impedance in the mixture circuit is clean and that we can start the cooldown. This step could take something like 10-15 minutes.
12) If everything is ok, the NIKA team will ask to turn on the Pulse Tube.
13) To do this, check that the pressures of the Pulse Tube compressor (located on the first floor of the telescope, picture **8**) are ok. The expected value are marked on the two gauges present on the compressor itself (picture **9**, red arrows).
9) If it is off (check if the water is flowing: picture **10**), turn on the water cooling system of the Pulse Tube, located on the first floor of the telescope (picture **8**). **NOTE:** this step is in general **not** needed as the water cooling is shared with EMIR, so it should be always on!
10) Then, switch on the Pulse Tube by pressing the green button on the compressor (picture **9**, green arrow).
11) The two indicators in the gauges shown by the red arrows in picture **9** should start to oscillate a bit.
12) For the time being that is all! The system will start to cooldown.
13) Now wait for the temperature to drop at 4K. The NIKA team will inform you about this. It takes in general about 24h.
14) When at 4K, close the manual pumping valve on the cryostat (green arrow in picture **1**).
15) Switch off the leak detector.

16) To maintain the system, every 2 days please refill the dewar for the nitrogen trap (picture **4**). The trap is to be kept *always* cold.
17) That's all!

To turn off:

1) Switch off the Pulse Tube at the first floor of the telescope (picture **1**)
2) In general, you should leave **on** the water cooling system (picture **2**), as it is the same of EMIR.
3) The cryostat will now start to warm up. During this stage, the NIKA team will take care (remotely if needed) of recovering all the 3He/4He mixture that was condensed
4) Wait for a 'green light' from the NIKA team that will tell you that all the mixture has been recovered in the reserve (picture XX). It takes usually 1 to 2 hours to recover the mixture.
5) **When the NIKA team gives the green light,** ***close the manual valve on top of the mixture container*** (picture **3**). This is located in the receiver cabin, a bit 'hidden' on the right (picture **4**)
6) Remove the nitrogen trap from the nitrogen vase. **Please keep it vertical all the time**, as if put horizontally part of the grease/dirt that the trap has blocked could get out of the trap and, at the beginning of the following cycle, might be sent towards the impedance by the flow of gas and block the impedance itself.
7) That's all!

Thank you for your help! In case of any problems, do not hesitate to contact a member of the NIKA team. The following is a list of possible contacts:

Grenoble Lab : 0033 4 76 88 90 72

Alain Benoit Mobile : 0033 6 02 08 50 48

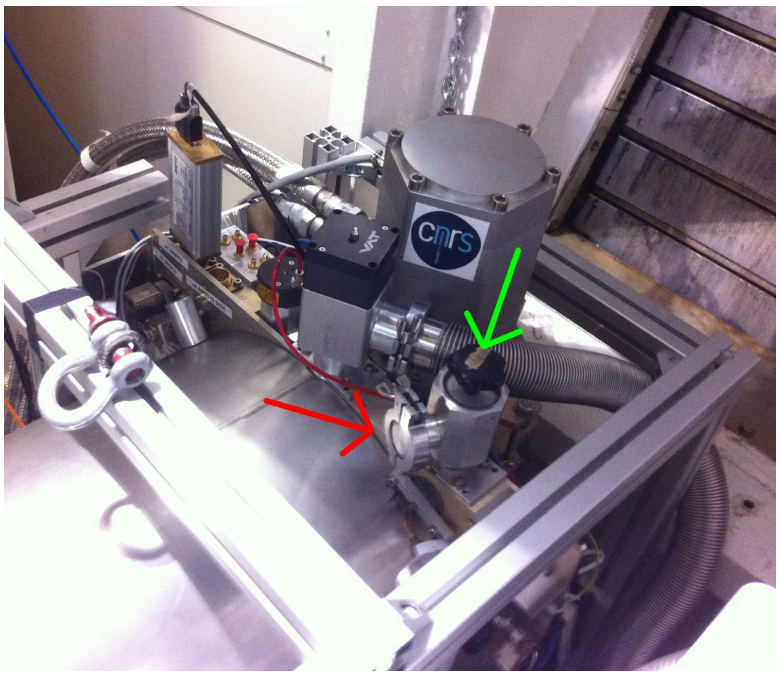
Alessandro Monfardini Mobile : 0033 6 11 57 01 61

Martino Calvo Mobile : 0033 6 01 49 90 11

Andrea Catalano Mobile : 0033 6 84 91 87 29

Images....

Picture **1**: the NIKA cryostat



The green arrow indicates the manual valve, the red arrow the flange to which the leak detector must be connected.

Picture **2**: the leak detector (more or less...)

The arrow indicates the 'cycle' button, used to switch on or off the pumping.

Picture **3**: the nitrogen trap

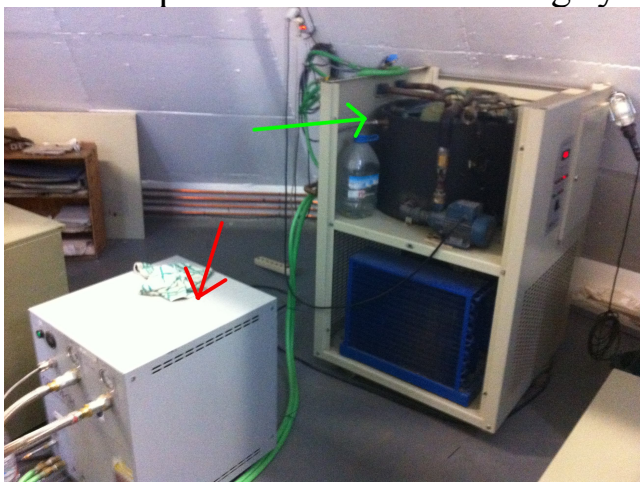
Picture **4**: the nitrogen trap inserted in the dewar

Picture **5**: the 3He/4He mixture reserve

The red arrow indicates the manual valve of the reserve. This must be open **only** when asked to do so by the NIKA team!

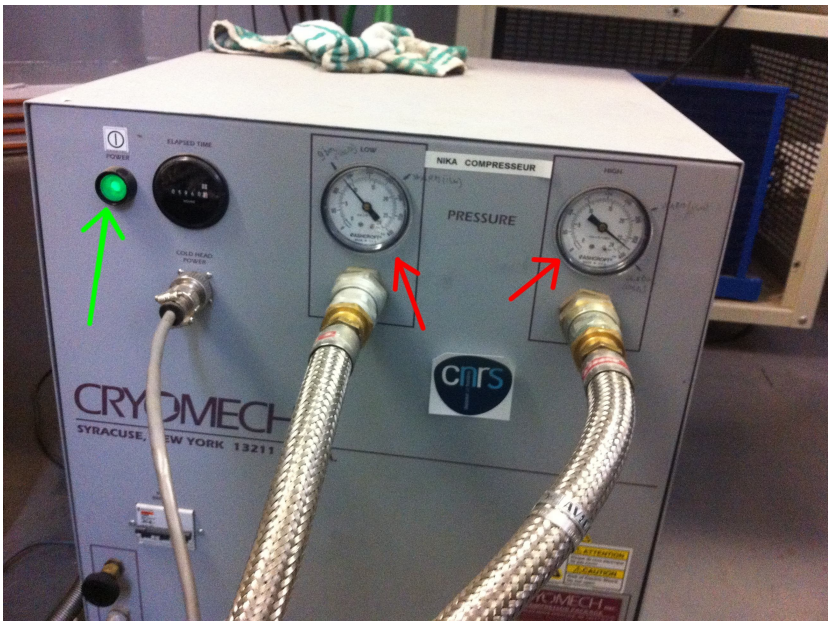
Picture **6** and **7**: the mixture reserve location

Picture **8**: the Pulse Tube compressor and water cooling system location



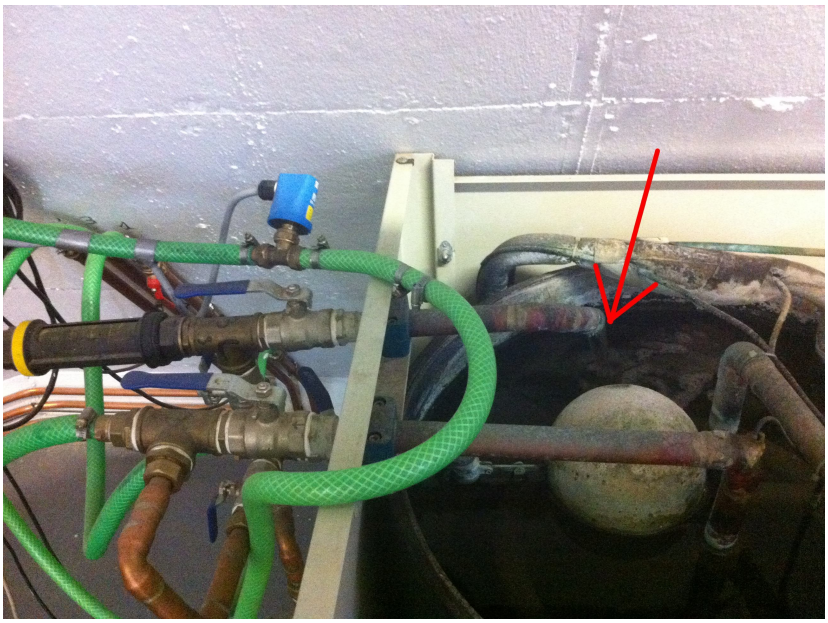
They are both located at the first floor of the telescope. Red arrow is the Pulse Tube compressor, green arrow is the water cooling system.

Picture **9**: the Pulse Tube compressor.



The green arrow indicates the button to power on/off the Pulse Tube compressor. The red arrows indicate the pressure gauges. The expected pressure values when warm and when cold are marked by hand directly on the compressor and are clearly visible (though not so much in this picture...)

Picture **10**: the water cooling system.



Please check if water is flowing from the pipe indicated by the red arrow. If it is, you can safely turn on the Pulse Tube!