HIRES Dewar Upgrade

Project Monthly Report – Mar20/4

Progress

Detectors

We measured the QE of 17-7-6 during a period of over 200 hours. We used dewar 7, carefully cleaned by Kirk, and a fresh charge of new Zeolite. We did an O2 soak for improved QE. At the end of the test 3200A QE was down about 10% and 4500A QE was up about 10%.

We postulated that we might be seeing water diffusing through the four o-rings of dewar 7 and depositing on the CCD and that the deposited water was changing the AR coating characteristics such that the optimum wavelength was moving to the red.

Therefore we repeated the experiment. We rebaked the Zeolite but this time we put the entire dewar inside a large plastic box which we sealed and continuously flushed with dry N2 boil-off from our LN tank. The humidity was at least a factor of 3 lower than the outside air. We stopped the experiment after 133 hours because we were still seeing QE changes. 3200A QE already had dropped by about 8% and 4500A QE was up about 8%. These changes occurred even sooner than they had with the first test.

Our conclusion is that water diffusion from the outside is not the dominant source of the changes we are observing.

One other thing we have observed in both of these tests is that the QE measured at the start of the test was NOT recovered by heating the CCD to -80C. Previously we had observed that the 'battleship grey' disappeared at about -80C. We thought that QE also came back to its original state. But the QE does not appear to recover.

We are now repeating the dry-box test with no Zeolite in the dewar.

We have the small vacuum oven up and running. Kirk has cleaned HIRES parts and using the oven. Only the big cold finger and LN dewar won't fit in the small oven. The dewar has been reassembled with all its internal parts except the mosaic and is being pumped and heated over a period of about a week. Following this we plan to install the dead chips and cool to check for contamination, and assuming there is none detected, we will install the engineering array and re-connect the controller so that software can confirm everything is working and to check out new code.

The large vacuum oven is moving forward too. Its ion pump is being refurbished. An overhead gantry and crane has been ordered to lift the top off the oven. We have a roughing pump and cold trap ready for integration. We've identified a source in town for the quartz heater lamps. We've cleared a space and prepared the utilities for installation. I

think it will be at least another month before all of the parts are together so it is still unclear if this will all come together in time to be useful for HIRES.

Issues and Concerns

The contamination issue and its resolution remain the most significant problem for this project.

Schedule

The Pre-Ship review, shipping, installation and commissioning schedules are delayed pending resolution of the contamination problem in the dewar. The earliest installation date remains August 04.

Budget and Spending Profile

To the end of January the project has spent $802,819 or 98% of the project cost estimate, not including contingency. A summary of the budget is attached. We expect to over spend the budget, including contingency, but have no plans to bill beyond the total agreed to price, which includes contingency.