

OAK RIDGE 25URC TANDEM ACCELERATOR*
2002 SNEAP LAB REPORT

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RADIOACTIVE ION BEAMS:

Radioactive ion beam development at the Holifield Radioactive Ion Beam Facility (HRIBF) this year has been focused primarily on targets. The most promising target geometry that we are testing consists of a thin layer of the target material deposited onto the fibers of a low-density, high porosity, rugged carbon matrix. This gives the advantage of short diffusion paths in the target material coupled with a high porosity substrate through which effusion may occur. The carbon matrix is the same as the one used successfully in the uranium carbide targets, which have been used for the neutron rich radioactive ion beam (RIB) campaign.

ACCELERATOR OPERATION:

During FY 2002, the 25URC has provided a total of about 2000 hours of beam on target, with about half of the beams being radioactive. No new beams were provided this year, but 24 different beam species, both stable and radioactive, were used. A significant accomplishment was providing 5×10^5 ions per second of pure ^{130}Sn on target for the first time. Operation for the experimental program was at terminal potentials from 3.2 to 23.8 MV. The problem of voltage ticking emanating from one pair of units, which was reported last year, has gone away. Actually, the problem may have just moved down the column, because we now have a lower pair which will not reach the voltage expected without sparking. In any case, we were able to run at 23.8 MV without ticking or excessive sparking. Nine tank openings were required during the year, two scheduled for general maintenance and seven unscheduled. One of the openings was due to a failed Georator bearing that had been installed in the first scheduled tank opening. The bearing was defective and had no grease, thus failing in a very short time.

FUTURE PLANS:

A new re-circulating gas stripper system, purchased from NEC, will be installed this year. This new system uses a fixed gas stripper tube, whereas the one we are using now is movable. The movable tube had the advantage of never impeding foil stripped beams (our foil stripper is now below the gas stripper), but an efficient re-circulating stripper was not possible. While we are doing this upgrade, we are taking the opportunity to change a few other things in our terminal. The foil stripper will be moved above the gas stripper so that we can break up molecular ions in the gas stripper before final stripping in the foil stripper. Since new vacuum enclosures are being made, we are also converting from NEC wire seals to Conflat® gaskets wherever possible. The 120 l/sec ion pump located at the exit of the low energy tube is being replaced by a Thermionics 400 l/sec ion pump. This pump was tested in our pressure test tank and worked up to 87 psig, which was the maximum pressure available for testing. We are also adding a new valve and some different pumping ports to improve our pump out. Besides giving new capabilities in

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stripping, this new stripper will allow us to dispose of the sublimator pumps which should do away with approximately two weeks of maintenance per year. While we are doing vacuum work in the terminal, we plan to rebuild all of the ion pumps in the machine (a total of seven) plus the ion pump at the entrance of the low-energy beam tube into the tank and the one at the exit of the high-energy tube from the tank.

We are still in the process of completing our move to Experimental and Industrial Control Systems (EPICS). We still lack one beam line and the entire cyclotron and its associated beam lines. The gas handling system controls upgrade got delayed, but hopefully it will begin this next year. We did put in a new weighing system (electronics only) for our SF₆ storage tanks, which is much more reliable than the old system.