computer control it turns out to be quite a reasonable technology which is quite general, and (apparently) quite efficient. In fact, the only other group we know of that has succeeded in injecting ions from outside the superconducting magnet is the McIver group. They use an rf quadrupole guide to overcome the magnetic mirror effect, but we hear that their injection efficiency is less than one part in ten thousand. We do far better because our initial ion beam comes from a very cold and well-collimated supersonic beam. We have very little off-axis energy in the initial ion beam, and a simple einzel lens is all that is needed to direct the cluster ions smoothly down the axis of the magnet where the magnetic mirror effect is a minimum.

Although we now have our first strong FTICR signals for a range of cluster ions (we've currently been able to get out to Nb_6^+ there is still quite a bit of development to be done on this very ambitious experiment. Just seeing a mass spectrum at high resolution is only the first step. We must get another one to two orders of magnitude of trapped ion density for the large clusters, and do extensive software development before the actual ion-molecule reaction and photodissociation experiments we have in mind will really be able to pour out of the machine. But I am now confident this will all happen.

CLUSTER ION PHOTODISSOCIATION EXPERIMENTS

A final area of extensive activity over the past year was the design and construction of a tandem double time-of-flight mass-spectrometer for photodissociation studies of supersonic