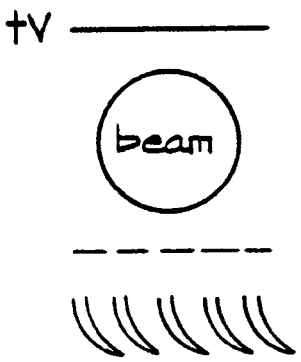
G. The Rutherford Ion Source, R. H. Morgan, RL

This is a simplified version which runs at 50 Hz with 500 μs pulses. The best current so far has been 35 mA but we can only stay in the cesium mode for about 15 min. We have been using cesium dichromate and are about to try the cesium boiler. Once the cesium mode is lost it cannot be regained. We are thinking of cooling the anode and cathode. Two separate power supplies are used. The first is a voltage supply used to start the cesium mode. It then switches to another supply. Possibly we need one supply to do both.

(Allison cpomments) If in switching supplies, the balance of cesium production by evaporation from surfaces is changed, one may need to heat up in a dc mode until the cesium operation is stabilized and then switch over.

H. Position Monitors and Scrapers, I. S. K. Gardner, RL

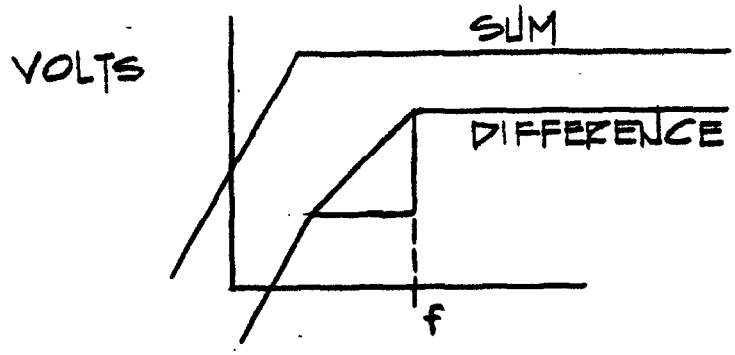
Most of the problems in the beam diagnostics area are with position monitors and phase measurements. It is planned to do profile monitoring with ionization systems possibly with some multiplication devices as illustrated in the following sketch.



To be run in some kind of pulse counting mode

array of multipliers (microchannel tubes)

The position monitors have a ferrite core with copper sheath having a gap. (See Fig. III-H.1). We couldn't get reasonable frequency response values (see sketch below) with one turn. Compared to electrodes, the signals are about 100 times weaker. We want accuracy better than 2 mm and will have 15 vertical and 15 horizontal monitors. We also want to be able to read them all within ~ 30 μs. A faster system is being designed looking at just one turn.



For phase detectors there is a problem since rf voltage varies by 40:1 during acceleration. A ratio of 10:1 is about all the present design can handle and we want a resolution of about 5°. The required rf voltage varies with the beam intensity.

The scrapers consist of 15-cm stainless steel coils (spirals) with cooling. They are arranged both horizontally and vertically to get ~ 99% of the beam which scatters from the foils. The radial positionings are more complicated because of dispersion. We are getting a code to run for these calculations now. Vertical motion has only been studied so far. A satisfactory solution for the high-energy halo is still being sought.

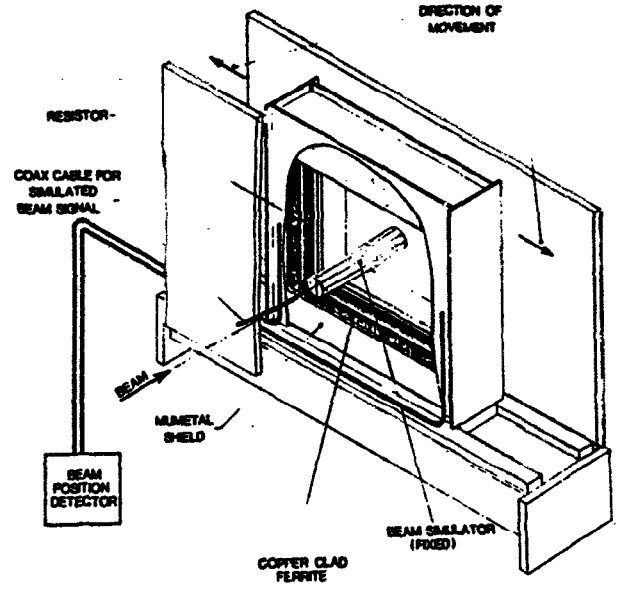


Fig. III-H.1. Prototype beam monitor for SNS.