

$^{21}\text{Na}(p, \gamma)^{22}$ Run Plan

-First run at $E_{b,in} = 1154$ keV/u (the yield peak) to measure the charge state distribution of the recoils ($q = 8+, 9+$ and possibly $7+$ or $10+$ and $11+$, depending on which charge state is most popular).

+Run for one hour at each charge state to obtain a rough estimate for the charge state distribution and the count rates at each q .

++If $P(10+) > P(9+)$, measure in the following order: $9+, 10+, 11+, 12+, 8+$

++Otherwise measure in the following order: $9+, 10+, 11+, 8+, 7+$

+Run for again for two to four hours at each charge state. We would like 200 to 300 singles counts of the most popular charge state.

+The charge state distribution measurements should take no more than 24 hours.

-After measuring the charge state distribution, I would like to start hunting for the left tail of the yield curve by running at 1114 keV/u.

+If the yield at 1114 keV/u is a significant fraction of the that at 1154 keV/u, then decrease the beam energy in 10 keV/u steps until the yield vanishes. After that point, increase the beam energy in 10 keV/u steps to map out the shape of the left flank.

+If the yield vanishes at 1114 keV/u, then increase the energy in 10 keV/u increments to map out the shape of the left flank.

-If there is time, we would then measure the yield on the right flank by requesting $E_{b,in} = 1159$ keV/u, and then stepping up the energy in 10 keV/u increments until we reach 1179 keV/u.

-I would like to perform two careful measurements (i.e. at two different energies) of P vs. MD1 NMR readback with five widely spaced (P, MD1) points per measurement. I would suggest the following pressures for the measurements: $\sim 1, \sim 3, \sim 4, \sim 5$ and ~ 6 torr.

-After measuring the dE/dx (keV/u/torr) of the beam in the target, use that value to calculate the input beam energies for the other runs. Please record the MD1 NMR readback value that centers the beam on the slits for each run. Record FC4 and P right before starting each run, and at the conclusion of each run.

Energies at which we ran in December 2003.

$E_{b_{in}}$ (keV/u)
1132.05
1140.81
1149.27
1155.69
1164.92
1178.4
1178.4

Desired Run Parameters

P_{run}	≈ 4.2 torr
FC4 (enA)	> 100 epA
time per run	3 to 6 hours