^{26g}Al Studies

Aims:

- Produce and Accelerate ^{26g}Al
- Measure contaminants
- Confirm ^{26g}Al via 363 keV resonance
- Ion chamber background rejection efficiency.

Tentative Schedule:

26th - 27th April

Assemble Ion chamber electronics. Test DAQ with pulser signals.

28th - 5th April - May

TUDA is running (Chris, Dario & Jonty required)

Wed 5th May

Assemble & test Ion chamber GHS.
OLIS tunes ^{21}Ne → 269 keV resonance.

Thurs 6th May

Take data on & off resonance.

Fri 7th May

Retract Ion chamber.

12th - 17th May

^{21}Na(p,γ)^{22}Mg run.

Mon 17th May (busy day!)

AM: Install Ion chamber.
OLIS tune ^{26}Mg 384 keV/u
M. Dombsky ^{26}Al yield tests.
EARLY PM: Establish ^{26}Mg tune - take some att. beam data
LATE PM: Switch to ^{26}Al
Owl Shift: Run on resonance (if time, off resonance)
Should be ~ 100 cts/hr coinc.

Tue 18th May

Contamination measurements (AM)*
PM + Overnight, more recoil data.

* to be discussed....

Run Plan:

A. Request Ebeam = 1154 keV/u from Ops.
B. Measure the dE/dx of 21Na in H2, and Ein.

1. Measure the beam energy after gas at roughly the following pressures: 1, 3, 4, 5 and 6 torr, and extrapolate to P = torr to find Ein. When performing the energy measurements, set the scaling page for q = 9+, and record the MD1 NMR value that centers the beam at each pressure.

2. If the extrapolated Ein is within 2 keV/u of 1154 keV/u, then fill the target until its pressure is ~4.2 torr, tune the beam through the separator, and switch to recoils at q = 9+.

C. Charge state distribution measurements

1. 1 hour charge state runs
    a. Run for 1 hour, and measure the recoil singles yield at q = 9+.
    b. Set the separator for recoils at q = 8+, and run for 1 hour.
    c. Run for 1 hour at q = 10+.
    d. Run for 1 hour at q = 11+.

2. 2 to 4 hour charge state runs. I would like to perform the remaining charge state distribution measurements at five charge states: 1 at the most probable charge state, 2 at the 2 charges state immediately below it, and 2 at the charge states immediately above it.

Based on the 1 hour measurements, run at the charge state with the greatest fraction until 200 to 300 singles accumulate in the recoils peak. If at least 200 singles counts do not arrive w/in 4 hours, then move on to the next charge state.

    a. Run for 2 to 4 hours at the charge state dq = 1 below the most probable state.
    b. Run for 2 to 4 hours at the charge state dq = 2 below the most probable state.
    c. Run for 2 to 4 hours at the charge state dq = 1 above the most probable state.
    d. Run for 2 to 4 hours at the charge state dq = 2 above the most probable state.

D. The search for the left-hand tail of the yield curve

1. Request Ebeam = 1114 keV/u from Ops.

2. If the above steps have not taken more than 36 hours, then measure the dE/dx and Ein of the beam by measuring Eout with the above method. Otherwise, fill the target until it reaches 4.2 torr, measure Eout at that pressure, and calculate Ein from Ein = Eout + P*dE/dx (dE/dx is the value obtained during the measurement at 1154 keV/u).

3. If Ein is within 2 keV/u of 1114 keV/u, then tune the separator for the most probable charge state, and run for 4 hours

4. If the yield at 1114 keV/u is a significant fraction of that at 1154 keV/u, then request a 10 keV/u decrease in beam energy.

    a. Measure Eout, and calculate Ein from Ein = Eout + P*dE/dx. Run at the new energy for 4 hours.
    b. If the yield is still a significant fraction of that peak yield, then ask for another 10 keV/u decrease in beam energy.
    c. Repeat until the yield vanishes.
    d. Once the we reach the energy at which the yield disappears, request a beam energy of 1124 keV/u, and run for 4 hours.
    e. Request a 10 keV/u increase in beam energy, and run for 4 hours.
    f. Repeat until we either run out of time, or we reach the end of the right flank (1179 keV/u).

5. If the yield at 1114 keV/u vanishes, then request a 10 keV/u increase in beam energy, and run for 4 hours.

    a. Repeat until we either run out of time, or we reach the end of the right flank (1179 keV/u).

E. Misc.

1. Right before each run, please record the following:
    a. The MD1 NMR value that centers the beam after gas
    b. The run pressure
    c. FC4