23Na(p,g) run plan

Overview

- Assemble
- Align
- Test
- Run
- End

Assembly

- Installation will require a lot of assembly of the target chamber and testing of the vacuum to ensure a good seal. Much of this will involve Dave O. and me, this week.
- Little parts in shop
- Gas target will be replaced with old tgt chamber

Alignment

- Here, we will be sighting through using the CCD camera and/or a telescope. The procedure is as follows:
  - Set up scope or ccd
  - Insert 3mm dia. Collimator (on target ladder), and line up crosshairs on CCD/telescope.
  - repeat a with 1mm dia. collimator to fine tune the alignment.
- Once the alignment of the scope/ccd has been done, the drives for positioning the targets will be calibrated (center = x,y …)

Testing

- Blindly set a position, then look to see that it corresponds to what is seen with scope/ccd.
- Check for repeatability and backlash.
- Check for interferences.

Running

- There are three targets that are most important to test:
  - Ni foil using rastering (number something)
  - Ni foil WITHOUT rastering (number something else)
  - Cu foil using rastering (number yet something else)
- This plan will give us a minimum of information should we lose beam before end of beamtime.
- Most of the development work will be done prior to installing an implanted target. The development work consists of tuning the beam at various energies.
- Target ladder will be used for electron suppression.
- Current will be read from collimators and cup and target (4 bnc feedthrus for this).
- Cup will be temporarily assigned to DRA:FC1

Running (cont'd)

- For each target:
  - need to sweep out a "+" or "x" pattern across the target, using the 1mm collimator
  - the pattern will require 21 steps, 11 in one direction (center +- 5mm), then +- 5mm about center in orthogonal direction., separated by 1mm, or one turn of screw, whichever is more convenient.
  - the pattern will be done at one beam energy (start at lowest: 300 keV).
  - once pattern is completed, the operators will load the beam tune for 302 keV (or simply scale the tune by +2 keV).
  - pattern of data is to be repeated at this energy
  - keep alternating these two steps (change beam energy then measure) until at 350 keV
- With "small-beam-spot" and one "rastered" target, and energy "on-resonance", change rastering amplitude to map out 23Na distribution as function of r.

Yield and count rate

- Er=309 keV, □□= 275 meV, assume ~40% efficiency from BGO, most abundant gamma is 11.987(2+)->4.24(2+)=7.75 MeV, BR=46%
- => Yield ~ 0.5 cnts/sec/pnA (on resonance)
- Count rate ~ 0.5*0.4*0.46=0.092 cnts/sec/pnA or about 1 count every 11 seconds / pnA
- Hope for ~100 pnA, but can live with ~1 pnA