

## DRAGON Meeting Minutes for 15 October 2002

Present: D. Hutcheon, A. Olen, J. Rogers, A. Laird, S. Engel, C. Jewett, J. D'Auria and L. Buchmann

### Business Arising:

A decision was made not to submit an  $^{15}\text{O}$  proposal to the EEC. Instead, the  $^{15}\text{O}$  proposal is going to the division head. JD

There has been success with the TR-13 runs. The beam energy was higher for the TR-13 runs, but the yields were not as exciting. JD

To produce  $^{15}\text{O}$  with OLIS, you need an ECR. Kearthi designed the ECR to run at 10 GHz. The OLIS rf speed is 2 GHz. JD is going to ask Kearthi to redesign the ECR so it will run at 6 GHz, so that he can use our amplifier. The tube is the key part, and that he bought new ones. Susie will finish her master's thesis in about 6 to 8 months. JD

The only ECR that has been built has an efficiency of 10%. They will hopefully use it to produce Ne and N this spring. Next fall they plan to use the ECR to produce stable ions. The expensive part is the amplifier, not the ECR. JD suggested that it would be nice to perform tests with the ECR next summer. JD

The energies listed in last week's minutes are the calibration energies.

Some of the subscripts on the energies in the minutes need to be changed from  $E_{\text{cm}}$  to  $E_{\text{lab}}$ .

They are supposed to ship the big power supplies for MD1 and MD2 tomorrow. DH will work out a replacement timetable with Claus. The people in Controls are sort of aware of this. The new MD1's are Filtek and the little ones are Zamteks. DH

Q9 and Q10 will need to be recalibrated. DH

AL: Will TUDA still be able to use DRAGON for stable beam energy measurements? 7 Nov. is when they will have beam.

MD1 needs to be replaced right away. TUDA's need to use DRAGON for energy measurements give the replacement higher priority. JD and DH

We are on the way to being able to see the position and size of the beam with the profile monitor and CCD. The CCD and beam profile monitor will provide both position and direction information. DH

JD: How sensitive will the spot be to radioactive beam? DH: It should be bright enough.

The beam profile monitor gives 1 mm resolution. DH

Dario noticed that the slits widened rather than moving up in position. The behavior is probably due to the collision microswitch. DH

JD asked about the matter of aligning the system. DH wants to put the profile monitor behind MD1. The CCD sees where the beam is at the gas target. The profile monitor measures the beam's profile at the charge slits. DH

AO: Suppose all of the equipment (CCD and beam profile monitor?) is ready by the time we have radioactive beam. Do we want to use them without testing them first?

Results from the Oct. 2002 beamtime

DH displayed a graph of  $\gamma$ -TOF (ns) vs.  $E_{\text{beam}}$  (keV/u) for the  $^{21}\text{Ne}(p, \gamma)^{22}\text{Na}$  data. He said that the plot should give an idea of the beam energy scatter. He is curious about whether the plot might reveal a relationship between rf and beam energy scatter. He plans to fit a smooth spline curve to the data in the plot. He drew the graph in an effort to understand the MD1 energy.

DH also displayed a plot of  $d\sigma_{\text{el}} \times E^2$  vs.  $E_{\text{cm}}$  (MeV) for the  $^{21}\text{Ne}(p, \gamma)^{22}\text{Na}$  data. The points did not quite fit the model as well as they should have. There may be a problem with normalization or something may be missing from the analysis. He displayed a plot assuming  $\sigma_e = 2$  keV/u and a plot assuming  $\sigma_e = 1$  keV/u, and suggested that the elastic cross section may be between 1 and 2 keV/u. DH said that because of the jumping around of the data, it is not a definitive test. He said that with stable beam we do not yet have a means of measuring beam intensity to better than 8%.

JR: There are three peaks in the elastics scattering data. SE suggested that the extra peaks might be due to dirt. DH suggested it might be due to light.

SE displayed a plot of recoil yield vs.  $E_{\text{beam}}$ . She had performed a fit to the data to obtain  $\omega\gamma$ . (See the attached graph.) DH said the tricky part is the estimate of the energy uncertainty. SE said that the spread in  $\Delta E$  is about 5%. DH said that it does not include the error due to beam spot location. JR argued against including horizontal (energy error) error bars in the final publication of the data. DH said that we can estimate  $E_{\text{beam}}$  with gas in/gas out measurements. AO argued for the inclusion of energy error bars, and said that we should include the chi-squared value. JD, DH and JR said that SE plot looked good.

JR present histograms of  $\text{ch-energy}$  taken from paw++ for the  $^{14}\text{N}(\alpha, \gamma)^{18}\text{F}$  data from Oct. 2002. The right panels on his graphs are position graphs, and the left

panels are energy graphs. The leakies peak appears at a lower energy position than the recoils peak in the DSSSD, which is unusual. AO mentioned a time when they filled the gas target with helium, and the leakies peak did not shift, so he said that peak shift is probably not due to a helium problem. He said that it may be due to details of the charge states. SE said they started with a 6+ tune, and they could not see any counts, so they switched to a 7+ tune. JR said that there may have been a lot of contamination in the He gas which contributed to the background (due to lack of time, we did not recirculate the He gas through the trap). SE said that she does not think that contamination was a problem because the target gas pressure changed very little.

JR revised the directions for reloading MIDAS, and presented the revisions in the meeting.

DH said that we need tape backups of data since ISDAQ will eventually fill up. To that end, JD is going to ask M. Lamey to find out when he last backed up the data.

SE asked who will analyse the run data if we do more stable beam runs.

Papers:

The 822 paper can have more additions.

The PRL has higher priority, and we should focus on one paper at a time. JD

AO asked if we should recheck the energy. JD mentioned that SB also had expressed an interest in doing that.

JD asked LB if it is necessary to remeasure the 212 keV  $^{21}\text{Na}+p$  resonance for the PRL.

The N measurement gives another point.

DH said there is room to expand the letter. He said we should add more information about ISAC in the PRL.

JR said we need to explain why we do not have a point part way down the leading edge of the 212 keV  $^{21}\text{Na}+p$  resonance in the paper.

JD said that we need to deal with the error on  $\omega\gamma$ . SE said it is due to errors in  $E_{\text{beam}}$  as well as statistical error. JR recommended adding an error table. He also asked about DRAGON acceptance error. SE said that she is working on that.

EEC Proposals:

JD said that the  $^{12}\text{C} + ^{12}\text{C}$  experiment should not require much beam intensity. He asked Bob Laksdale about the status of the gas stripper. SE said we do not have the acceptances and intensities that Rolfs has. LB said we plan to perform the measurements at higher energies, so the lower acceptances and beam currents should not matter.

DH: Is it easy to distinguish gamma cascades from the  $^{12}\text{C} + ^{12}\text{C}$  reaction?  
JR said that he untangled the  $^{60}\text{C}$  cascades, so he thinks it is feasible.

There was a dispute as to whether we should push to get more different types of radioactive beam or whether we should focus on wrapping up data from the past radioactive runs.

JD said we need to submit a project grant proposal soon, so we need to think about new projects (maybe upgrades of DRAGON, new beams, etc.)

JD recommended that we set up a collaboration meeting to deal with the above issue.