

Minutes of the Eighth Meeting of the Physics & Instrumentation Task of the EURISOL Design Study

Dipoli Congress Centre, Helsinki, 20th September 2007

T10-08,Helsinki,200907

Present: E. Běťák, Y. Blumenfeld, A. Bonaccorso, B. Fernandez Dominguez, P.T. Greenlees, A. Kordyasz, N. Marginean, N.A. Orr, R.D. Page, E. Pollacco, B. Roeder, K. Sonnabend, K. Subotic, P.M. Walker

1. Minutes of previous meeting and matters arising:

It was confirmed that the beam analysis spectrometer should be specified by Task 10.

The preliminary list of beams that should be developed as the highest priority for EURISOL was discussed. The general parameters of the post-accelerator were also discussed and it was reported that there could be difficulties with the pulsing structure of beams from the post-accelerator. These will have to be considered at a future meeting.

C. Volpe had provided a summary of the work R. Lazauskas had performed during his EURISOL-funded appointment. He has now secured a permanent position in France and will contribute to writing the final report.

Y. Blumenfeld gave an update on the second financing situation.

2. Update on specimen experiments and instrumentation:

a) [Neutron detection schemes for direct and break-up reaction studies](#) B. Roeder reported on his recent work to incorporate event generators for single neutrons into the simulations and developments in the neutron scattering model to allow for the rotation of the reaction plane, which is necessary because neutron scattering off carbon is highly directional. Future work will include adding a multiple-neutron generator to the simulation code. A [poster](#) had been presented at this Town Meeting exhibiting some of this work.

b) **Sweeper magnet, ancillary detectors and the Transfer Reaction Array** Work on this has yet to start.

c) [Integrated charged particle and \$\gamma\$ -ray detector system](#) B. Fernandez Dominguez presented an update on progress with simulations for an integrated charged particle and γ -ray detection system. Calculations have now been performed for the realistic case of $^{132}\text{Sn}(d,p)^{133}\text{Sn}$ using preliminary data from Oak Ridge as an input. The simulations indicated that provided the size of the beam spot is ~ 2 mm in diameter, it has much less effect on the resolution than the target thickness, so it should not be necessary to track the ions. It was suggested that the effect of increasing the granularity on the energy resolution should be investigated and a realistic angular distribution should be incorporated, if possible. The array should also be made larger to allow time-of-flight measurements and the beam energy varied to find the optimum value. A campaign of experiments using TIARA+MUST+VAMOS+EXOAM will be performed at SPIRAL during Autumn 2007, which will provide an in-beam validation of the design concepts being investigated.

d) **Cryogenic and polarized targets** F. Marechal is willing to contribute to the Design Study and should be consulted on how a cryogenic target system might best be incorporated into a charged particle detector array. **[Action: B. Fernandez Dominguez]**

e) **Recoil separator** P.T. Greenlees reported on the test using VAMOS that took place in July. Unfortunately this was fraught with technical problems, but C. Theisen is still confident of a successful outcome when it is repeated. The reaction $\text{Ne} + \text{Au}$ was attempted and the beam was transported in a controlled manner, then the evaporation residues were collected with an efficiency

of ~40%. Input was awaited from W. Loveland regarding the best reactions for producing superheavy nuclei. Recent work at Dubna indicated that the cross section for symmetric reactions with a Xe beam was below 10pb. This could mean that asymmetric reactions will be better, requiring the use of actinide targets.

3. **Preliminary cost estimates and layout:** R.D. Page presented the compilation of input received from sub-task leaders regarding the major instruments foreseen for EURISOL, their estimated cost, space requirements and any additional considerations. These will be sent to sub-task leaders for consolidation, then circulated among the wider community for further input.

[Action: R.D. Page]

4 . **Other news of progress from sub-tasks:**

f) **Astrophysics** C. Angulo has had to step down as sub-task leader. K. Sonnabend has agreed to replace her and is also the new coordinator for the CARINA network.

5. **Reports on PDRA activities:** These are reported under 2a) and 2c).

6. **EURISOL User Group and workshop:** A. Bonaccorso outlined the preliminary plans for the workshop, to be held in Florence on 14th – 17th January 2007. Ideas for the programme were suggested and individuals were proposed to help with the organization.

7. **Issues for EURISOL DS Management:** None.

8. **Any Other Business:** It was pointed out that there is no specimen experiment on high-spin physics, which is a significant omission.

[Action: R.D. Page to contact AGATA community for input]

P. Chomaz had recommended investigating whether it would be worthwhile studying electron-ion scattering at EURISOL. This would depend on what was likely to be possible at FAIR and whether EURISOL might do significantly better.

[Action: R.D. Page to follow this up]

9. **Date & venue of next meeting:** During the EURISOL User Group Workshop in Florence, in the week beginning 14th January 2008.