

Minutes of the ISOLDE Physics Group Meeting, May 24th 2017

There were no comments to the minutes of the last ISOLDE PGM.

The meeting began with a discussion with Tim Giles on the status of the ISCOOL. The main ideas gathered are:

- The ISCOOL high voltage has been limited in the past years to 30 kV due to a problem with the insulators of the injection and extraction electrodes. This problem was solved by replacing the insulators and now the ISCOOL has been re-tuned to work at 40 kV, also in bunching mode. The transmission was recorded to be around 70% with bunching.
- An internal report on the re-commissioning work is being prepared and will be available for users. If urgent information is needed before the report is completed, the raw information is available in Tim's office.
- Tim would like to organize a hands-on session together with Stewart and interested users, probably in one of the weeks following the ARIS conference.
- The insulators were tested to work up to 60 kV, but so far no standard tune of the RFQ was performed at a voltage higher than 40 kV, although ISOLTRAP and VITO did use the ISCOOL at 50 kV this year.
- ISOLTRAP reported some problems with the beam at 50 kV on HRS. It was noticed that from one day to the next, without apparently changing anything, the beam shifted by a few millimetres in the wire scanner after the second magnet. This is clearly not an ISCOOL problem, it could be related to the front-end voltage, but it is certainly a possible problem to keep in before an important on-line run.
- There is an interest from ISOLTRAP in the kick-mode extraction, for using the bunched beam in combination with the ISOLTRAP (or future ISOLDE) MR-TOF MS. One would require some additional power supplies, but would also potentially complicate the operation and set-up of the ISCOOL. This can be implemented in the long run, but one must find a solution, which allows for an easy switch between the slow and fast extraction modes and which does not disturb the stability of the ISCOOL for laser-spectroscopy experiments.
- The limit on the RF amplitude is due to the limitations of the available amplifier. There are discussions with the technical support at CERN for building a more powerful one, but a preliminary quotation is in the region of 100 kCHF. A commercial solution would be of interest, if it meets specifications. If anyone has suggestions concerning good commercial RF amplifiers or HV switches, please contact Tim.
- The problem of the GPS cycling was brought up to Tim, but in his opinion there can be several possible causes. It can be related to the Hall probe, or the magnet power supply, or even the way the beam is tuned through the GPS magnet. The recommendation is to first contact the Hall-probe or power-supply experts.

Technical news

- **HRS**
 - ISCOOL bunching tests with injection into the ISOLTRAP MR-TOF MS took place end of last week.
 - STAGISO tests were performed on both separators last week. They will continue throughout the year every time there is a target with neutron converter and an available time slot.

– GPS

- The target #595 was replaced with the titanium foil target #599 for magnesium emission channeling (see Physics and schedule).
- Unfortunately the problem of the extraction electrode moving by itself occurred again.
- It took some time to unclamp the target, but it seemed to be a pressure, rather than a mechanical problem.
- It was noticed that there is an offset on the zero of the scanners SC482/483 (about 1.5 mm), which can no longer be corrected from the application. Lefteris is looking into it.
- This week a new carbon-nanotube target was supposed to be installed for the boron run, but unfortunately the fluorination did not work very well, which created a significant delay in the delivery of the unit for installation. Currently a used target is installed (#513). The yields seems to be one order of magnitude lower, but the experiment can still be performed with this rate. (The yield of 8B increased slowly to a value of $3-4 \times 10^4$, slow extraction around 400 ms. The reason of the slow increase in production could be due to the fluorination process).
- The high-voltage power supply on the GPS front end broke. Jan Schipper replaced it, but now it cannot go beyond 40 kV before tripping. It is thought that the breakdown might have been caused by a repeated reset of the power supply, although the front end could not hold the high voltage anymore. The message for users is that if there is an HV trip one should first check the vacuum in the target area. If there is a vacuum spike, this might indicate that there is a good reason not to try to turn the power supply back on. The problem was finally identified in the humidifier in the target zone that was broken. The 8B experiment ran at 30 kV and repairs of the humidifier are planned for the coming week.

– REX/HIE-ISOLDE

- The controls of the pulsed electrodes of REXTRAP were not working.
- The magnets which are part of the high-energy beam optics were ramped on Friday to maximum current. In the meantime, some of the fences installed for this test were removed. The work continues with some further alignment checks.
- The ISS supports are being delivered and installation work will begin soon. Some drilling will be required.

Physics and schedule

- The schedule for the second trimester of the year is almost finished. One HIE-ISOLDE run might move and there might be some VITO and COLLAPS runs in between the HIE-ISOLDE experiments. To be confirmed.
- The air conditioning in b. 508 will be started next week.
- The emission channeling run on magnesium went very well. Its goal was to study the behavior of the interstitial/substitutional character of the magnesium dopant in GaN semiconductors, which is a long-standing problem, especially with respect to the dependency on the concentration of magnesium. It was found that the standard limit for the magnesium concentration in usual applications can be surpassed by a significant amount without losing the substitutional character of magnesium. There are many interesting spectra to analyze.
- The next run on GPS addresses the beta-decay of ^8B , with special interest on the so-far unobserved electron-capture to a highly excited state in ^8Be , followed by emission of a proton around 300 keV. A special concern of the experiment is the suppression of the beta background in the proton spectrum. In addition to this possible new decay mode the experiment tries to address the isospin mixing of the states 16.6 and 16.9 MeV states in ^8Be .

Safety

- The HIE-ISOLDE beam permit was signed by some responsables, but is still being circulated.
- For the first time CRIS had a significant amount of radiation on in its charge-exchange cell region. This is because of a non-optimal transport through a collimator, which accumulated some long-lived activity. Procedures are being followed for decontamination. The idea of using the fume cupboard which is already available in b. 508 for future decontamination work is being considered (this would avoid having to remove the material from the controlled area).
- There is a large variety of roughing and turbo pumps at ISOLDE which makes it sometimes difficult for RP to perform oil checks. One possible approach would be to provide a list of all pumps to RP, although it is not clear how this would be of help. An alternative would be to always have someone who knows the pump models there when the RP sample is collected. There are also some pumps at ISOLDE which are a bit more difficult to handle from the RP point of view.

AOB

- Liam is setting up an instance of the PSI ELOG on the ISOLDE server and will create blank ELOGs which can be used by interested experiments.

Seminar

- The meeting was followed by the seminar of Simon Lechner from TU Vienna on "Proton therapy simulations at MedAustron".

The next PG meeting will take place on Wednesday, May 31st, at 14:00. It will not be followed by a seminar.

Minutes taken by VM