Draft Minutes of the 74th Meeting of the ISOLDE Collaboration Committee held on Nov 10th 2015

Present: A. Algora(via Skype), K. Bharuth-Ram, B. Blank, K. Blaum, Y. Blumenfeld, J. Cederkall, M.J. Garcia-Borge, P. Greenlees, D. Jenkins (via Skype), M. Henry, Y. Kadi, K. Johnston, N. Marginean, K. Riisager, N. Severijns, S. Siem, L. Schweikhard, M. Venhart, S. Gilardoni

Excused : R Catherall (replaced by Thierry Stora)

Absent: U. Datta Pramanik, S. Harissopulos, R. Losito

Invited: R. Page, J.A. Rodriguez (P.T.), W. Venturini (P.T.), J.J. Valiente Dobon, S. Roccia, V. Fedosseev

The meeting started at 09:00 h

Introductory remarks and approval of minutes

The chairperson opened the meeting and extended particular welcome to the new members from Slovakia and South Africa represented by Martin Venhart and Krish Bharuth-Ram respectively.

The minutes from the previous meeting were approved without any further corrections.

NEDA Array and its potential use at ISOLDE

Jose Javier Valiente Dobon (LNL (INFN))

Jose Javier Dobon presented the possibility of bringing a new array to ISOLDE, NEDA (Neutron Detector Array). This is a neutron array detector which could be integrated with MINIBALL to allow for neutron detection in addition to gamma rays. It is based on a liquid scintillator EJ301 with good neutron-gamma discrimination capabilities.

Details were then presented of the detectors: they are regular hexagons to a depth of 20cm. They employ 5’’ Hamamatsu R11833-100HA photomultipliers with a QE of 33%. They use 3l of PSA liquid EJ301, with TiO2 reflection paint. A voltage divider is transistorized for large counting rates. 1mm mu-metal shielding is employed. The array is flexible allowing for many focal positions, depending on the experiment. The angular resolution at 0.5m is +/- 7 degrees; at 1m it is +/- 4 degrees. The energy resolution at 1m is 40%; at 7m it is 5%.

The NEDA collaboration has existed since 2012 when the MoU was signed. The following countries are members of the collaboration:

Bulgaria; France; Italy; Poland; Spain; Sweden; Turkey; United Kingdom.

Some thoughts on the likely physics programme which could be pursued at ISOLDE with NEDA were then presented. One area would be to study fusion evaporation reactions. A possible goal would be the identification of excited states of T_z = -3/2 in ^{45}Cr with a view to studying T=3/2 mirror pairs in the $f_{7/2}$ shell. This could be accomplished by the following fusion-evaporation reaction: $^{7}Be + ^{40}Ca \rightarrow ^{47}Cr^* \rightarrow ^{45}Cr + 2n$ with a cross-section of 20μb. Examples were also presented for transfer reactions using ^{3}He to investigate the structure of ^{60}Zn. Shape coexistence could also be explored in ^{80}Zr using ^{78}Sr @ 4MeV/u. The spectroscopy of ^{20}Mg could also be investigated to explore whether it is spherical or not. Numerous other transfer reactions were also presented.

A likely timeline was also shown. The earliest time that it would be available to come to ISOLDE would be after the LS2, perhaps in 2021, following campaigns at GANIL and SPES. It could then remain at ISOLDE for 2-3 years. For planning its incorporation at ISOLDE there would be a need to call for LOIs to explore the physics needs. A detailed mechanical study of the integration with MINIBALL would be needed. Similarly a study on the integration with MINIBALL electronics would be required. The NEDA collaboration would install the setup at ISOLDE, ideally with the help of a full-time technician for 1-2 months. There may be some safety issues, especially with regard to the EJ301 liquid.

The committee feels that it would be interesting to host NEDA at ISOLDE. Physics cases should be explored in more detail and a further presentation to the ISCC could be made approximately two years from now. LOIs could subsequently be submitted to the INTC.

HIE-ISOLDE SC-Linac performance and plans for the shut down

Walter Venturini Delsolaro

Walter Venturini presented an overview of the HIE-ISOLDE superconducting cavity linac performance as was used for the first HIE-ISOLDE run. The roadmap for 2015 was shown with the assembly of the Cryomodule (CM) taking place since January and the various steps towards the completion of the installation of the beamlines XT01 and XT02 etc. The very dense schedule did not allow for much delay, and the first beam for physics was delivered to MINIBALL at 4MeV/u on 22nd October.

The goals of the hardware commissioning were presented. They were to define the operational envelope for the machine; to validate the software and controls and to identify, investigate and document the weak points and limitations preventing hardware to reach nominal performance.

The HIMAC (HIE ISOLDE MAchine Commissioning) working group brought together all the equipment owners along with strong involvement from BE-OP (Beam Operations). This resulted in accurate preparation work allowing for properly written procedures. For the HEBT (High Energy Beam Transfer) circuits, tried and trusted LHC procedures were used. For the HEBT commissioning, the XT00, XT01 and XT02 circuits were released for operation. This allowed for operational currents to be set for the 2015 physics run, and the B-field control for dipoles was validated.

The main commissioning steps for CM1 were then presented which is fully described in EDMS document number 1511269. These included tests of the interlock, RF, instrumentation before cooldown, low level RF tests, cool down, RF above Tc and RF tests at 4.5K, SC solenoid tests, the survey and alignment, heat load measurements and thermal cycles.

The cryostat design was found to be within expectations, and the alignment of the cavity did not show any anomalies. The vacuum to the experimental stations – e.g. MINIBALL– is one ongoing area of concern. The risk of damage to the system due to an unforeseen venting at the experimental stage requires more complete interlocks as well as vigilance from the users.

The first beam to be accelerated through the superconducting cavity was $^{12}C^{4+}$ and the cavities were thereafter phased at ~ 3.9MeV/u. From weeks 25-26 commissioning with beam commenced. In weeks 27-33 the HIE-ISOLDE diagnostics boxes were checked-out. The phasing of the RF structures then continued where many problems were encountered and dealt with. At this time the operational settings (i.e. the phases and amplitudes) for all the RF cavities were determined.

Thereafter, the commissioning with the high energy beam transfer continued through weeks 33-38. In weeks 40-43 the beam was accelerated through the SRF cavities. The first attempt was made in week 40, and by week 43 all the cavities were phased for $^{12}C^{4+}$. The $^{12}C^{4+}$ beam was finally transported to the end of XT01 in week 43.

The delivery of the beam to MINIBALL had various settings. Initially (for stable tuning) the beam was $^{22}Ne^{7+}$ at 2.85MeV/u. The first radioactive $^{74}Zn^{25+}$ beam was delivered at 4MeV/u . In week 44 this beam was delivered at 4 MeV/u and 2.85 MeV/u. The latter case was typical REX energies and this was possible overnight due to the unexpected stability of the RILIS scheme for ionizing Zn. In week 45 the beam was re-scaled and $^{76}Zn^{22+}$ was delivered at both 4 and 2.85MeV/u.

Due to heating problems with the RF couplers, the HIE-ISOLDE mode was limited to working hours: 6 hours per day and no overnight/weekend operation. Some interventions were also needed to replace a damaged Si detector and to fix problems with a faraday cup.

Regarding pending issues, the RF couplers have received quite some attention. The first observations of a problem were seen in CM1 when the RF began shifting. A full cold test was made in SM18 and resulted in a failure at 200W. The source of the heat in the coupler was then sought after. Numerous tests were carried out to identify possible mechanisms and regimes where the coupler could encounter problems. Eventually the heating issue was found to be due to pure RF heating. To prevent it, the coupler antenna needs to be properly cooled. To ensure this, a new thermalisation system for the copper and cable was launched. The antenna material was changed to Cu OFE, and the antenna is now to be welded to the cable. This solution now needs to be tested as soon as possible to maintain the 2016 planning.

For 2016, the design and procurement of the parts for the repair of CM1 and CM2 are ongoing. CM1 is to be uninstalled before Christmas. Once a solution is verified for the coupler, the cavities and ancillaries for CM2 will be installed (they are currently on-hold). Over the winter, CM2 will be shipped to ISOLDE, then CM1 will be retrofitted with the coupler solution. Then it will be shipped back to ISOLDE with the aim of starting a physics programme at 5.5MeV/u in the summer of 2016. A planning for this work has been drafted and will be implemented over the shutdown.

In addition to the work already carried out in 2015, there remain quite a few elements of commissioning which need to be completed before the shutdown. These include sending beam to XT02, understanding some of the limits of the machine scalability (A/Q and energy) and understanding better the sources of beam losses and the optics. Calibration and systematic commissioning for diagnostic boxes and faraday cups needs to be completed. Some elements of the controls still require attention and systematic measurements of the properties of the beams: emittance, Courant-Snyder parameters need to be completed.

In summary the 2015 programme of hardware commissioning achieved its goal. The machine was operated in a reliable – albeit limited – mode and the CM design choices were validated. The SC cavities field measurements were validated with beam and the RF coupler issue has been identified and is being addressed. However, additional time for beam commissioning would be ideal, and this will be needed for 2016.

Commissioning of REX: status of the 9-gap amplifier

Jose Alberto Rodriguez Rodriguez (CERN)

Jose Alberto presented an overview of the commissioning of REX in 2015. After an initial introduction to the structure of the REX accelerator, including the RF systems, magnets etc, he discussed the hardware commissioning which was carried out in 2015. Before week 25 the power converters and magnets were prepared. There were 19 new power converter units installed; new water cooling circuits were put in place and made operational, and various tests and measurements in all other quadrupoles were completed.

The vacuum had its scheduled maintenance and faulty pumps, controllers and gauges were replaced. Fast Penning gauges for the fast acting valve to protect the cryomodule were installed.

The low level controls were made functional including those for power converters, RF amplifiers etc. High level controls were updated for working sets and equipment arrays.

Maintenance and refurbishment of amplifiers for the six first structures was carried out. DC converters (incl. spares) were refurbished, HV diode repaired. A temporary 9-gap amplifier has been installed. The PLC (Programmable Logic Controller) software for amplifiers was upgraded and a connection was made to the new HIE-ISOLDE RF reference line.

The commissioning of the machine with beam has been described. This started in week 25. A beam with an A/Q=4.0 was accelerated to 0.3 MeV/u (equivalent to the RFQ output energy). The first diagnostic box was reached and the faraday cup, MCP and collimator wheel were re-commissioned. Beam transmission through RFQ for different power levels was achieved in week 26.

The next stage was commissioning of the HIE-ISOLDE diagnostics boxes. The first of these was installed at the end of week 27. The first beam in the FC and to the Si detector was with 0.3 MeV/u energy. Systematic characterization was carried out by E. D. Cantero and S. Sadovich.

The phasing of the cavities was carried out, as described in the previous presentation. The cavities and their amplifiers were commissioned after they were turned on by the RF team. Several problems in the different RF systems were discovered and solved at this time. Finally, operational settings (phases and amplitudes) for all RF cavities were determined.

The status of the RF amplifiers was then described. The RF amplifiers have been very stable and reliable since week 36. Only one short intervention for the 7-gap amplifier was necessary during the commissioning with beam and operations of HIE-ISOLDE. The average and peak powers were not very demanding (the repetition rate was 10 Hz or lower). It will be necessary to confirm reliable operation under more demanding conditions next year. Several cooling fans have failed and will need to be replaced during the winter shutdown.

The status of the 9-gap amplifier was then described. The final amplifier was supposed to be ready for the start of the physics program this year. However, the delivery was delayed and the RF group provided a temporary amplifier which has been used during the physics run this year after some modifications were made. This amplifier is limited in peak power and duty cycle and would introduce many constraints in the physics program next year if it is not replaced.

The new amplifier failed an acceptance test conducted in week 36 at the company headquarters. The situation had improved by week 41 when the next visit to the company took place. However, several non-conformities were still found. There will be a new visit in about 2 weeks from two CERN experts to help the company solve the problem.

Overview of the cost of phase I

Yacine Kadi (CERN)

Yacine Kadi presented an overview on the cost of the phase I of HIE-ISOLDE.

The Cost to Completion of the HIE ISOLDE Project has not changed since August 2015. The cost of phase 1 & 2 with the 3rd experimental beam line in its shortened version is 40.4 MCHF, of which 27.4 MCHF is borne by CERN. The third beamline is entirely funded by CERN. This will allow physics with HELIOS before the installation of the TSR.

Some savings have been identified and correspond to: 397kCHF for the infrastructure and 89kCHF for the machine. In addition the shift in exchange rate between Euro and CHF has allowed for savings of 260kCHF and 175kCHF for the infrastructure and the machine respectively. This situation is summarised in EDMS 1558162. The saving for the infrastructure will be reimbursed to CERN but the machine part of 264kCHF will remain with the project as savings.

The cost evolution of the project was presented. By extrapolating to the final cost for the project it was shown that on the infrastructure the cost would be either 21.3MCHF or 21.6 MCHF in the best and worst cases respectively. For the machine, the final costs were 17.3 and 17.6 MCHF respectively. This leads to a final cost to completion for the project of 39.4 – 40 MCHF.

Procurement for phase II is well underway. The procurement process for the third beamline, has just been launched.

The evolution of the cost variance was presented, and was shown to be ~400kCHF, rather than -1 MCHF in July 2015, in line with the previous discussion. The cash flow for phase I and II for the collaboration was also presented. The contributions from KU Leuven are now at an end and the corresponding team accounts have been closed. The funding secured so far is not in line with expenditure and the collaboration will be short of cash flow between 2015 and 2025. This will peak in 2016 with a deficit of 3.4MCHF. The pay-back time for the funding received so far is now expected to be 2025, although this is pending the result from the Norwegian proposal.

This is in line with CERN management’s expectations, and no problems are expected owing to this deficit.

A question was asked about the Norwegian money. This is part of an upgrade application for ATLAS/ALICE & ISOLDE. It didn’t go through the last time. The breakdown was for 600kCHF for components and 500kCHF for manpower (perhaps for phase III).

A question about phase III was asked. Phase III has been removed from the medium term plan. The collaboration should work to get it back on track.

Planning for HIE-ISOLDE phase II

Yacine Kadi (CERN)

Yacine Kadi presented the planning for phase II of HIE-ISOLDE. The enormous progress which has been made with HIE-ISOLDE in the second half of 2015 was duly acknowledged. This culminated in physics being possible in October 2015. However, with the re-engineering of the RF coupler there is a need to work out coherent planning for CM 1 – 4.

The preparation for running with both CM1 and CM2 is now well advanced. This will require new couplers being installed and then completing CM2 and the repair of CM1. A plan was presented showing how this repair and subsequent commissioning work could be accomplished by the end of July 2016. This would allow for physics to re-start on HIE-ISOLDE in August 2016.

The planning for HIE-ISOLDE phase 2 was shown. A detailed planning (as described in EDMS 14708950) was shown. Procurement for CM3 and CM4 was launched in August 2015. Before March 2016, the clean room in SM18 will not be available, thereafter the assembly of CM3 will commence and will continue until September 2016. As HIE-ISOLDE will be running, cryogenic tests for CM3 and CM4 will be carried out in the M9 bunker at SM18. Towards the end of 2016 there will be a modification of XT00 for phase 2: the quadruplet will be pushed forward and a doublet will be moved to XT03.

It was then described that phase 2 is now being split into two. Phase 2a will take place in 2017 and allow for physics to be run with CM1-3. In parallel to this CM4 will be tested in the bunker and its installation and commissioning will be held over until 2018. The four cryomodules are expected to be ready for operation in April 2018. In addition there will be some changes to the beam optics.

In summary, radioactive beam was delivered to MINIBALL on October 22nd 2015. CM1 has been shown not be capable of sustained operation and will be repaired in 2016. The thermalisations on the RF power line will be improved. There is now a coherent planning for CM 1-3, and the collaboration is asked to agree on the shift allocation for the high-energy physics run 2 &3, in 2016 and 2017. Procurement for the 3rd beamline and the extension of XT02 for HELIOS has been launched.

Technical news, initiatives for the coming shutdown and TISD Activities

Thierry Stora (CERN)

Replacing Richard Catherall, Thierry Stora presented the numerous technical issues which have affected ISOLDE in 2015. Throughout the year there have been various problems with the coupling of targets. On both frontends the coupling piston has been exposed as being a weak point. On the HRS a new metal piston has been installed in October, and this will also be done during the shutdown on GPS.

A water leak which occurred on July 28 close to the BTY line from the PS Booster to ISOLDE was found to be due to a disconnected tube and faulty valve used for the purge of the magnet cooling system. A permanent repair will be made during the shutdown.
There was a problem with the GPS extraction electrode in August which was found to be due to loose screws on the extraction electrode mechanism. The reason for this will be investigated and revised during the shutdown.

On several occasions this year, the telemax robotic system has been used for remote investigations of the front end and it will now be the standard procedure to remotely assess problems using the telemax prior to human intervention.

During the next shutdown, many works are in preparation among them the removal of the magnetite shielding; the creation of an air-locked system to separate the ventilation of the class A lab and the target area; and the finalisation of the ISOLDE/MEDICIS integration e.g. shielding, rail conveyor and the installation of the KUKA robot for storage of target units for MEDICIS.
For targets which operated for physics this year, there were some notable figures: in particular the integral number of protons taken on a target was a record: 13.3×10^{18}: this allows for efficient use of the facility, but does cause problems for waste management afterwards.
In target and ion source development, the negative ion source run yielded data, but more offline work is needed to understand the data. The Pb/Bi high power target's design is now finalised and manufacturing has started. The new UO_2 batch has been delivered and has been used in targets for the second half of 2015: the yields produced with this UO_2 appear to be at least equivalent or better to what has been measured with earlier batches.

RILIS has had a very busy and successful year. 17 elements were produced with 2250 hours of physics being supported amounting to ~ 75% of 2015 ISOLDE physics. Among the achievements were the first optically pumped radioisotopes using ISCOOL and RILIS; the first radiogenic Ba beams; very strong RILIS-ionised In beams; negative ion photo-detachment and the first online coupling of RILIS to the VADIS ion source for Hg beams.
Money has been granted from consolidation for the replacement of both front ends in LS2, however, it has not been granted for the replacement of ISOLDE's beam dumps. Without this the facility won't be able to benefit from the higher intensities foreseen when LINAC4 starts operation.
A work request for the realignment of all the beam lines at ISOLDE has been submitted to the PLAN office pending the approval from the ISCC.

The installation of the new control room for ISOLDE will commence on November 2015.
Following the presentation, MJB asked if the 2uA limit for the protons to ISOLDE could be revised in the future? This needs to be addressed to RP.
BB asked about negative ion sources. What are the next steps? TS replied that some basic tests need to be re-taken, in the form of offline work.

RILIS: new advances and future prospects

Valentine Fedosseev (CERN)

Valentine Fedosseev gave an overview of the recent advances at RILIS. This included the infrastructure itself and the developments which have taken place for operational mode and for ion source development.

For the lasers, since the end of LS1, there has been a newly-added lumera laser. This runs at 40W and at a repetition rate of 10kHz. It has a 17ns pulse with a low jitter of <3ns. This allows for much better transmission to the ion source and has raised the ionization efficiency by >50% for many elements.

There has also been an upgrade of the Ti Sapphire laser which was constructed at Mainz and has now been brought to CERN. This will be a powerful tool for RILIS beam development.

There have been many new control and diagnostic developments which have been made possible since the extension of the RILIS cabin. There is now a new beam stabilization system and the increase in space has allowed 4 beams to be delivered to GPS and HRS and 1 to ISCOOL for optical cooling within. In addition the upgrades have resulted in fewer power losses and improved ergonomics.

At the test benches:

In LARIS (Laboratory for Resonance Ionisation Spectroscopy) there is the slow 10Hz repetition rate laser and work is ongoing to develop laser ionization of volatile elements with thermal atomization with the use of a time of flight mass spectrometer. There is also work ongoing for the ionization of refractory elements using laser ablation with the MS TOF (Time Of Flight multi-reflection spectrometer).

At the current off-line mass separator there are space limitations which allow only for 2-step schemes to be developed. R&D continues on the ion source cavity, with ion detection using faraday cups and multi-channel plate. The new off-line mass separator will have space for an extended setup which will allow for the full laser setup and for more possibilities for ion source R&D. The spare lasers will be installed in the new off-line separator located at the old UC lab in building 3.

Details about the operation of the RILIS in 2015 were then presented. Due to the dual Dye-Ti:Sa laser system it is now possible to setup for a new element while a different element is being ionized. This has proved to be a very effective and efficient mode of operation and has resulted in 17 elements being provided using RILIS in 2015. The setting-up time for the lasers has been reduced to a day and a half if the planning has been properly chosen.

The lasers have now an active stabilization system which allows for the beam position to be fixed in the ion source; the laser wavelengths are monitored and pulse timing can be stabilized.

Remote monitoring can now be accomplished in building 508 in the newly installed RILIS control room, allowing for a more comfortable environment for the team. It has allowed to go from the shift rota of previous times to an “on-call” mode.

In ion source development there have been many new beams developed, among which are: Ba; Hg; Li; Ge; Cr and Te. There are now 37 elements which can be produced using RILIS at ISOLDE. Ongoing work is also continuing for Rn, Er, Lu and Se.

Work has also been ongoing in improving selectivity. Recent work has focused on bunch compression, where lasers are bunched; when a suitable gate is applied this can result in much higher selectivity; tests are continuing with Li.

Also, a low work function material has been developed to reduce surface ionization. Tests with thoriated tungsten are under preparation. In addition extremely high selectivity can be obtained using the LIST source, at the expense however of intensity. Now a more advanced model is under development with a quartz line to reduce surface ions, along with better overlap of lasers and atoms.

There are also new modes of ionisation under development. One such is the combination of RILIS and the VADIS unit (VADLIS). One can run in two modes: VADIS with the anode > 100V and RILIS mode with anode ~ 5V. This has been demonstrated for Ga, Ba, Ba2+, Hg and Cd. This results in higher flexibility for the users in a fast mode, and allows for RILIS compatibility for molten targets as it was demonstrated for the Hg run in April 2015. R&D work continues at the ISOLDE off-line separator.

One particular example where this could be useful is to suppress surface ions for Ba using a carefully chosen low work function anode material.

In terms of organization, since July 2015 a new working group from EN-STI-LP (lasers) and EN-STI-RBS (targets) has been established. This combines expertise especially in ion source and ion beam manipulation R&D. Areas which will be dealt with include the HRS upgrade, LIST, VADLIS and optical cooling in ISCOOL, among others.

Finally the personnel issues were addressed: the RILIS team is currently standing at 5 full-time members, although Sebastian Rothe and Tom Goodacre are due to leave soon. New fellows are Christoph Sieffert and Katarina Chrysalidis. During operation periods there are visiting collaborators from Gatchina.

INTC matters

Klaus Blaum (Max-Planck-Gesellschaft (DE))

Klaus Blaum spoke of the recent INTC and research board meetings. Although the most recent meetings had relatively few proposals, the backlog on both the high and low energy side is sufficiently large that this is not an issue.

From the INTC meeting in July it was specifically mentioned that although ISOLDE's worldwide advantage was in the variety of radioactive ion beams available there was also a lack of manpower on the technical side. The INTC strongly supported the funding of a limited duration position to relieve this situation.

There will be a presentation to the SPC on the 15th December.

It was also discussed about the currently poor situation regarding visibility of recent publications from ISOLDE. Whereas high energy physics have a central repository this is not currently the case for ISOLDE, which can reflect poorly on the facility giving an appearance that the output is less than it actually is. This has partly been due to the desire from CERN not to have information in more than one place. The current excel sheet on the ISOLDE website is not considered to be adequate.

CERN library can offer support for maintaining this information in a more coherent and up-to-date way. One of the problems with ISOLDE is the diverse nature of the experiments compared to, say, ATLAS and CMS. **Spokespeople and users will be urged to submit fully up-to-date publications and PhD work related to ISOLDE at the time of beam requests.**

NICOLE set-up: Present status and Future Plans

Stephanie Roccia (CSNSM Universite Paris Sud IN2P3 CNRS)

Stephanie Roccia presented an overview of the present status of the NICOLE experiment. The current physics programme and status of the collaboration was presented. The current priority is to have the setup ready for the first angle- and energy-resolved beta delayed neutron measurement on medium heavy nuclei.

The NICOLE collaboration currently stands with the following people and institutes:

University of Maryland, College Park, USA (J.R. Stone, W. B. Walters); University of Tennessee , Knoxville, USA (C.R.Bingham, R.Grzywacz, K. Kolos, N.J. Stone); McMaster University, Hamilton CA (B. Singh); Niigata University, Niigata, JP (T. Otsubo); University of Surrey, Guildford, UK (P. M. Walker); CSNSM, Orsay, FR (A. Etilé, C. Gaulard, S. Roccia); LPSC, Grenoble, FR (G. Simpson); ILL, Grenoble, FR (U. Köster); CERN, CH (M. Madurga).

The last two physics runs were successful until a cryogenic problem appeared in 2011. Since then the fridge has been repaired. Since the commencement of the HIE-ISOLDE works, Stephanie reported that a lot of deleterious consequences have been visited upon NICOLE. These include the moving of the pumping cabinet to open a trench; the disconnection of the main infrastructure (electricity, water etc); the loss of space on the mezzanine due to the installation of the power supplies for HIE-ISOLDE.

The NICOLE team have reported misalignment issues, the need to adapt what was previously working and damage to the fridge, attributed to the HIE-ISOLDE work.

The system is not yet operational. Adaptation to the new level of the mezzanine floor has been completed. Connections to water, electricity etc are still ongoing. The realignment is almost completed and various new pieces are still being ordered and/or machined.

Perspectives for the upcoming experiments were presented on the beta-delayed neutrons from oriented $^{137, 139}$I and $^{87, 89}$Br nuclei. This will require the presence of the VANDLE spectrometer as it would be the first experiment of its type, a strongly motivating factor for the collaboration.

The collaboration asked if it would be better to restart with a more standard experiment before VANDLE to verify if the system is working correctly. Stephanie replied that this is indeed the case.

Stephanie acknowledged that there was a delay in reacting from the NICOLE side, and the lack of a permanent presence at ISOLDE for NICOLE has hampered their progress. A question was made about when the damage had been reported? It had been unknown to some of the members of the collaboration. The need for a permanent local contact dedicated to recommissioning the unit was re-emphasized. When asked about the length of time still needed to get the system running, a time of about 8 weeks was mentioned, with two people on-site for 8 weeks to allow this to happen.

It was proposed that from the HIE-ISOLDE side that if there was damage arising from the construction work, this would be covered. But a detailed itemization of the damage is needed before this can be covered.

The need for better communication especially prior to coming to ISOLDE to work on the setup was stressed. The list of requirements needs to be sent well in advance, as is the case for other installations. Stephanie volunteered that she should be the contact person for any specific questions regarding the installation.

A question was asked about future experiments in addition to the currently accepted one. It was mentioned that once, re-connected and operational that there were at least 5-6 proposals which were likely to be submitted.

The current situation with the 9-gap amplifier which is temporarily installed close to NICOLE was mentioned. Some pumps were moved from NICOLE, which was not appreciated by the NICOLE collaboration. However, it was stressed that the amplifier was installed following appropriate discussion and approval.

It was stressed that assistance would be made available to the NICOLE collaboration to ensure that it could be made operational within as short a time as possible.

It was apparent that there was considerable frustration with the situation from the speaker about which the collaboration expressed some concern. It was clear that communication between the NICOLE collaboration has been poor and it was agreed that this should be addressed. To kick-start this discussion, it was agreed that the list of equipment which has apparently damaged should be procured as soon as possible. When Stephanie was asked, she said that she was aware of the recuperation line. An e-mail was sent by MJB on the 11th November requesting a list before February of what was supposed to be damaged during the HIE-ISOLDE works. Once this list has been received the discussion can be continued.

Helios-type Spectrometer for ISOLDE

Robert Page (University of Liverpool (GB))

Robert Page from Liverpool presented the status of the plans for bringing a Helios-type spectrometer to ISOLDE. The first meeting of the HELIOS@ISOLDE collaboration was held on 29th September and involved groups from Liverpool, Manchester, Daresbury, Edinburgh, Leuven, Jyvaskyla, Argone, Saclay and ISOLDE.

For the procurement of the magnet the status is as follows. Funding is available from the UK STFC and the University of Liverpool. A suitable magnet has been found from the University of Queensland in Brisbane, which had been used for MRI studies, but is no longer needed. This is an OR66 4T unit. It employs an active shield to reduce the stray field. Originally installed in February 2003 it was discharged and warmed in 2013, and has been unused since.

The University of Liverpool has received the draft contract from the University of Queensland and procurement is advancing. The unit needs to be delivered and paid for by 31 March 2016.

The plans for the transport of the magnet to CERN are in progress. Siemens have been contacted for controls, and a shock log device has been purchased. The intention is to dispatch the unit in December 2015 with transport taking about 40 days to arrive at CERN. A delivery address at CERN is required.

Once at CERN the unit will need to be stored and tested. This will require a special area which will have the infrastructure required to allow re-commissioning of the device. In particular, close access to liquid helium is required. For cooling the magnet will need ~ 6500l of LHe. Once cooled and powered, field mapping and shielding tests will be conducted. Support for this will be provided by the University of Leuven.

For installation in the ISOLDE hall, the magnet is itself >17T, which is too heavy for the ISOLDE crane. Alternative solutions for bringing into the ISOLDE hall are under discussion including using a “skating” system to allow it to be wheeled inside. The footprint of the magnet is 2975mm x 2340mm. To install on XT02, further beam calculations will be required. Shielding is a particular concern and Davide Tommasini has been contacted to perform shielding calculations. A CAD layout of the ISOLDE hall is sought to assist with this. Siemens will also provide field maps to Davide Tommasini.

The expected timeline is the following: departure from Brisbane in January 2015; arrival at CERN February-March 2016. The magnet will then need to be commissioned and field maps measured. Eventual transport to the ISOLDE hall is not yet determined, but the aim is to have preliminary physics experiments in 2017/2018 with a refurbished Si array. In early 2019 a new Si detector array will be commissioned. Some of the logistical aspects of the installation in the ISOLDE hall were also presented, such as accommodation with the third beamline.

Summary of Experiments in 2015

Karl Johnston (CERN)

The ISOLDE physics coordinator presented the physics programme from 2015. In spite of the technical problems which have been encountered throughout the year, it was still a broadly successful year for physics.

Physics started on April 15 and will run until Nov 16th. The year has been divided into two parts: low energy physics until early October, and then the commissioning/experiments which were carried out on the new HIE-ISOLDE beamline.

There were 471 low energy shifts requested of which 373 were scheduled – including three weeks for the negative ion source runs – 260.5 were delivered: a success rate of ~70%, in line with previous years. For 2016, the protons are expected to be delivered for physics from April 11th and run for 31 weeks.

In 2015, there were quite some issues with the controls which delayed or complicated the setting up and running of experiments. The ability of the facility to run at 60kV was questioned and transmission through the RFQ cooler has been an ongoing problem, which will be addressed during the shutdown. An overview of some of the highlights was presented along with some of the failed experiments. Among the highlights were the experiments on Hg and Au isotopes carried out by the windmill/ISOLTRAP/RILIS groups early in the year; the first successful optical excitation through the RFQ for COLLAPS during the Mn beamtime; successful measurements of Cu and Ga isotopes by CRIS; the successful installation of the VANDLE array at IDS; use of the new TIMEPIX detectors for emission channelling and a wide variety of new isotopes used for Mössbauer spectroscopy. In addition there was a very successful run for medical isotopes.
The major highlight of the year was the start-up of HIE-ISOLDE on Oct 22nd. This ran on ^{74}Zn and ^{76}Zn in an alternating 4MeV/u and 2.85MeV/u during days and nights respectively. The strong efforts of all the technical teams in realising this milestone were greatly appreciated by the users.

Building 508 is now fully operational with the installation of the user laboratories for solid state and laser spectroscopy, as well the DAQ and visitors room. The kitchen is going to be installed in November. The access to ISOLDE is now fully linked to the training courses which need to be followed: in particular the hands-on RP and electrical awareness courses. Temporary dosemeters are no longer allowed.

News from the ISOLDE Group, MoU and Update of Annexes

Maria Jose Garcia Borge (CERN)

Maria Garcia Borge presented news from the ISOLDE group. The manpower in the ISOLDE group was presented. Since October 1st, the ISOLDE physics coordinator is Karl Johnston, replacing Magdalena Kowalska. The collaboration thanks Magda for her excellent work as coordinator over the past 5 years. Since October 1st Giacomo de Angelis has started as an associate for seven months and Ismael Martel as a corresponding associate for 3 months. The remaining manpower is unchanged since the previous meeting of the ISCC.

Then she reported on the upcoming events: 2 separator courses in November, the ISOLDE workshop in December and a COULEX school in January 2016.

There is a possible start for ENSAR2 on the 1st December 2015. At the latest it will start on 1st January 2016. Note since the meeting: ENSAR2 will now start on 1st February. Users from ENSAR2-associated non-EU laboratories can be supported; this would allow for some support, for example, for users from iThemba labs.

There is a request from the ISOLDE collaboration to the HIE-ISOLDE project to move the 3rd beamline closer to the 2nd by 30cm. Optics calculations from Matthew Fraser indicate that this is feasible in terms of future beam transport. However, there is still some input required for the shielding around HELIOS. Once this is known, it will be clearer whether this displacement is feasible or not. In this event, then an Engineering Change Request (ERC) would be required, as the infrastructure and pillars for XT03 are already installed and are part of the machine. As such a financial cost and considerable work would be involved. This will be readdressed in the February ISCC meeting.

There was some news about EURISOL-DF. The goal of this project is to prepare a strong physics case for RIB science and applications to support, upgrade and coordinate the various European ISOL facilities with a view towards EURISOL. Five working groups have been established: WG1 on science and applications; WG2 on Acceleration; WG3 on beam handling; WG4 on Spectrometers and detectors and WG5 on EURISOL-DF relationships and legal structures. A meeting of the third working group was held in September 2015, but this is still at a very early stage.

News then followed about the ISOLDE collaboration. South Africa has signed to be a member in 2015, and the Slovakian minister of science has signed to the MoU to be a member from 2016. Bulgaria has agreed with the ISOLDE MoU and is expected to sign it before the end of 2015. Poland has submitted an application in September 2015. There are ongoing problems with the Indian and Greek contributions. The continuing participation of Ireland is pending the decision about whether or not they will become an associate member of CERN.

The financial status of the collaboration was then presented. Outstanding fees are remaining for Greece (since 2012); India and Ireland (since 2013). A large majority has already paid for 2015. This keeps a healthy balance to face the HIE-ISOLDE payments. From 2016 payment of the loan to CERN will commence at the rate of 140kCHF per year for 5 years. HIE-ISOLDE will also be paid at the rate of 400kCHF per year.

For the renewal of the MoU, the current document is valid until Dec 2016. It can be quite difficult to gather signatures for each renewal of the MoU. The possibility of having an automatic renewal is being discussed. The ISCC members agreed to go for an automatic renewal of the MoU. This would require an amendment to the current MoU in points 3.1 and 3.2. To allow for this automatic renewal of the MoU, the ISCC would also need to agree and secure the agreement of the parties by signing the new version.

Martin Henry discussed the current situation from Ireland. Ireland has been under negotiations about becoming an associate member of CERN, which – if it happened – could aid the situation for ISOLDE. This discussion has now been postponed until December. Until this discussion takes place it is not possible to give any more information about whether Ireland can remain a member of ISOLDE for the foreseeable or long-term future.

In 2016 there will be a formal celebration for the phase I of HIE-ISOLDE, and is likely to take place on 28th September.

The term of the current ISCC chair will end with the June 2016 meeting. ISCC members are requested to submit nominations for the next chair who should be appointed at the next meeting (February 2nd).

A.O.B.

The next meeting of the ISCC will take place on the 2nd February 2016.

On 1st February there will be a workshop to discuss the priorities for the 2016 HIE-ISOLDE physics campaign.

N.B. The overheads mentioned in the above minutes can be found via http://indico.cern.ch/event/452769/