



*Minutes of the 100th Meeting of the ISOLDE Collaboration Committee
held on June 21st 2024*

Present: J. Cederkäll, L.M. Fraile, S. Freeman, G. Georgiev, S. Gilardoni, A. Herzan, H. Heylen, M. Kowalska, K. Lynch, H. Masenda (replacing D. Naidoo) A. Nannini, J. Pakarinen, M. Pfützner, I. Martel, C. Mihai, G. Rainovski, K. Riisager (replacing H. Fynbo), J.A. Rodríguez, L. Schweikhard, N. Severijns, E. Siesling, N. van der Meulen, J. Vollaire

Excused: H. Fynbo, D. Naidoo,

Absent: A. Lagoyannis, S. Siem

Invited: L. Nies (P.T.), F. Wenander (P.T.)

The meeting starts via Zoom at 09:00 h

1. Introductory remarks

The ISCC Chairperson, L.M. Fraile, opens the 100th meeting of the committee and welcomes the participants. K. Riisager is replacing H. Fynbo at this meeting, while H. Masenda replaces D. Naidoo. The committee is told that W. Nörtershäuser will take over from L. Schweikhard as the German representative at the next meeting of the ISCC. The committee thanks L. Schweikhard for his contributions to both the ISCC and the ISOLDE facility.

The committee expresses its sadness at the passing of Mats Lindroos who made a significant contribution to the facility especially during his time as the ISOLDE technical coordinator; a tribute, written by P. Butler, will appear in the CERN Courier and the CERN Bulletin. A moments silence is observed in remembrance.

2. Approval of the Minutes of the last meeting of February 21st 2024 and the meeting agenda

The agenda of the meeting and the minutes from the previous meeting are approved.

3. Update on PUMA and layout – L. Nies

The committee is briefly reminded of the aim of the PUMA project and that, due to it being too costly to transfer radioactive beam from ISOLDE to the AD facility, it was decided to develop technology to transport large quantities (up to 10^9) of antiprotons from the ELENA experiment to ISOLDE where they will be mixed with radioactive ions. However, a transfer beamline will still be required at ISOLDE to prepare the beam and deliver it to the PUMA setup. The design of the beamline, that incorporates devices from the MIRACLS experiment, is presented; the MIRACLS scientific programme is due to finish by the end of 2024 at which point, after the required adjustments, the hardware required by PUMA will be installed in the new transfer beamline. The committee is told that most of the beamline ion optics elements have already been sourced. It is then shown how the beamline will have two possible operation modes. The first will be a DC mode that will deliver a

continuous beam to handover points and the second will be a mass separation beam that will provide a bunched beam. The design of the mass separator is briefly summarised.

The proposed location of the transfer beamline and the PUMA setup in the ISOLDE experiment hall is shown to the committee along with related space requirements such as the necessary exclusion zones. The PUMA magnet will be shielded but the field still needs to be mapped after which the use of floor space will need to be optimised; this will possibly include the repositioning of some MINIBALL hardware. At the end of the straight section of the transfer beamline there will be a second experimental space available for temporary experiments that would benefit from ultra-high vacuum; there has already been interest expressed by two experiments. The section of the beamline that bends off towards the PUMA setup will belong to the PUMA experiment and, as present, there are no plans for other experiments to use this during the periods when PUMA is at the AD facility. It is currently planned for the PUMA setup to be at ISOLDE two to three times a year for a period of about two to three weeks. The committee is told that the CERN transport team has tested the transport process from ELENA to ISOLDE using a mock-up of the setup and no obstacles were found.

L. Nies presents a tentative schedule for the installation of the transfer beamline and tells the committee that the aim is to send the first radioactive beams to PUMA at ISOLDE at the end of 2025, before LS3. K. Riisager clarifies that the PUMA project was approved by the Research Board for beam at AD but no beam has yet been approved at ISOLDE. The ISCC agrees to communicate to the PUMA Collaboration that they should seek INTC approval of beamtime by LOI or proposal submission as soon as possible. The presentation concludes with an overview of the PUMA collaboration and the ISOLDE-RC6 team.

A discussion takes place about the use of floor space in the ISOLDE experiment hall by PUMA and it is suggested that an extra 30° bend in the section of the beamline considered part of the experiment would lead to an improved position of the PUMA setup with regard to maximizing the use of space, considering future high demand. The committee decides to ask the PUMA Collaboration to prepare a new design and complete the required technical studies for its experiment beamline in order to make the most efficient use of space. If it transpires that putting an extra bend in the beamline is not possible then the PUMA Collaboration will need to communicate this to the committee in order for a final decision to be made. The proposed PUMA installation schedule would suggest that the ISCC may be asked to make a final decision on the location of PUMA before the next committee meeting in November 2024.

The committee clarifies that any changes, upgrades or extensions of experimental setups that have space requirements must be approved by the ISCC. S. Freeman will draft a procedure for space requests.

4. Discussion of potential investments – start of the conversation

4a. Update on LS3 Improvements and introduction– *S. Freeman*

The decision timeline for the ISOLDE improvement programme is shown to the committee with the next step being the CERN Council approval of the MTP 2024. A positive response from the Council would mean that around 20MCHF would have so far been made available for the improvement programme: 3.060MCHF for the FIRIA ventilation project (MTP 2023) and 12.964MCHF for the beam dump replacement (MTP 2024) as well as 2.180MCHF for REX consolidation and 2MCHF for new power converters on the BTY line from consolidation budgets. The remaining projects, that would require a total budget of about 5MCHF, are listed; these have either been postponed to MTP 2025 or require consolidation decisions. An, as yet unknown, amount of funding will also be required depending on the outcome of the task force looking at cryo-management of HIE-ISOLDE and the outcome of discussions concerning the 9-gap resonator and logistics of consolidation of current superconducting cavities. The amount of funding included in MTP 2024 should be seen as a

positive signal to the ISOLDE facility. Discussions about the items to be requested in MTP 2025 will start in September 2024.

S. Freeman explains that, while the first priority is to maximise use of the present facility and the upgrades already approved and funded, an on-going discussion needs to start to establish, beyond LS3 improvements, the priorities for investments from the Collaboration and to develop a plan for LS4/LS5 improvements. It is also important to determine the long-term strategic directions of the facility on post-LHC timescales. To facilitate these discussions, ideas from the ISCC have been collated and the current overview distributed to the committee. The committee agrees that, in order to identify priorities, information such as risks, technical feasibility, timescales etc should be added to the list of possible upgrades but feedback from the ISCC members and their communities will be required. The following presentations on EBIS upgrades, ISRS and possible hall extensions are not meant to be exhaustive but to activate discussions.

It is explained that degradation of HIE-ISOLDE performance below design parameters, mostly due to the non-aging deterioration of HIE-ISOLDE cavities, has become an extremely pressing issue as it is limiting operations. S. Gilardoni assures the committee that CERN management considers the solving of this issue of high importance and is a pre-requisite for all future projects at ISOLDE. Work is underway to decide the best solution, but manpower, expertise and infrastructure availability will be determining factors. The committee agrees to give S. Freeman the flexibility to offer resources to help solve this issue if required and that a presentation will be required at the November meeting about the status and needs of HIE-ISOLDE along with how this impacts other possible projects and the physics programme.

4b. EBIS 5T upgrades – *F. Wenander*

The present charge breeding system is presented and the committee told that, with the non-adiabatic gun installed in 2020, the system has been world leading until recently when ANL released the latest result from the CARIBU EBIS. F. Wenander briefly summarises what aspects of the EBIS system could be addressed to improve its performance and explains that to achieve a shorter breeding time a higher current is required for which a new electron collector is needed. The committee is shown the design of a new electron collector that is due to be tested in the autumn of 2024 and, if successful, installed during LS3. This is one of the low-intensive, incremental improvements of the EBIS that are on-going.

F. Wenander briefly presents two possible concepts for a 5T EBIS upgrade. The room temperature version, already designed on paper, is based on a proven concept already used by CARIBU at ANL while the cryogenic version uses a new untested concept. Currently the design of the cryogenic “paradigm-shift” device is being pursued but any upgrade will require major resources in terms of funds and manpower. Any new device will require extensive off-line testing so a minimum timeline of 5 years would be expected.

A. Rodriguez thanks F. Wenander for his efforts and states that the electron gun installed in 2020, due to its superior performance, has ensured that the ISOLDE physics programme has not been more affected by problems with HIE-ISOLDE.

4c. Hall extension possibilities – *E. Siesling*

The committee is reminded of several extension concepts developed in the past. In 2014 a large TSR building next to building 508 was considered and in 2016 the possibility of a smaller construction for a compact storage ring in the same location was studied. However, both plans had to deal with the constraint of a CERN service tunnel on the Jura side of the ISOLDE hall. Building an extension on the ISOLDE parking lot was considered in 2011 but legal issues related to the Swiss/French border make this a complicated option. The long-term solution to capacity problems at the facility would be

to extend the facility with a new experimental hall such as that proposed by the EPIC study in 2020 but that would require an associated science project. It is stressed that any smaller extension should be compatible with the long-term goal of an “EPIC” extension.

4d. ISRS update and possibilities – *I. Martel*

The status of the ISOLDE Superconducting Recoil Separator project is presented along with an overview of the R&D work packages covered by a Spanish grant running from July 2023 until December 2025. The committee is told that activities are developing smoothly and that the expected outcomes from the work funded by the grant are a conceptual design report and prototypes of the SC magnets, an ion test bench and a focal plane detector as well as the MHB buncher and the magnetic scanning system. The institutes currently part of the ISRS Collaboration were listed; new collaborators are welcome to join the project both now or after 2025, whether it be by providing personnel, funds or technical feedback.

I. Martel explains the ISRS performance requirements with respect to the possible physics programme and informs the committee that an ISRS Physics Workshop will be held in Huelva, Spain, by the end of September 2024.

The committee is told that the injection/extraction system for the ISRS will be a big challenge. Further funding will be needed to realise the full ISRS system. Regarding the timeline of the project it is hoped to install the ion test bench and multi-harmonic buncher as well as set up an offline test site at CERN during LS3 with future construction/commissioning of ISRS after the long shutdown.

The committee briefly discusses the space requirement of the ISRS project; if the PUMA setup is able to incorporate an extra 30° bend then this would free up space that might be appropriate for ISRS, while the project would also be a candidate for possible hall extensions. The committee stresses that if the ISRS collaboration wish to install equipment at CERN during LS3 then they must start discussions about safety etc. now and this should include the submission of a LOI to the INTC to cover this activity.

5. Collaboration Matters – *S. Freeman*

Firstly, the committee is informed that a visit of the ISOLDE facility by the CERN Council took place on the evening of Thursday 20th June from which positive feedback was received.

S. Freeman briefly reviews the huge amount of work that has been done since the start of 2024 to support a safe working environment at ISOLDE and stresses that it is important to maintain continuous support for the safety culture at the facility. The committee agrees that formal thanks should be sent from the collaboration to those involved in the recent work on safety issues. It is explained that, after an incident occurred with the crane in the ISOLDE hall, a temporary safety measure is in place meaning that it can only be operated by the CERN transport service. However, this should end once a new ISOLDE specific crane training course is in place and a laser collision avoidance system is installed. It is clarified that soldering of small items is still allowed in the ISOLDE hall provided that the item is not contaminated and small extraction fans are in place. After recent incidents at the facility, there has been an intense period with a high workload regarding safety but this should stabilise in the near future.

The status of the recruitment process for the next ISOLDE Physics section leader / Collaboration Spokesperson is summarised. The procedure agreed by the committee in February is being carefully followed and the advertisement for the post went live on 4th June with a deadline for application of 6th September. Between now and mid-July, the Search Committee, presently made up of M. Kowalska and J. Cederkäll, will contact ISCC members to arrange individual Zoom meetings with those who wish to discuss possible candidates to whom the search committee could reach out. From 9th to 18th

September, ISCC members who wish to and who are not planning to apply for the post themselves, will be able to give comments/suggestions on the applications to help the Search Committee make a shortlist of maximum three or four candidates; those committee members who wish to give their comments are asked to inform S. Freeman as soon as possible so that a request can be made to HR now to arrange access for them to Smart Recruiters to be able to view the applications. On 4th October the shortlisted candidates will receive an invitation to be interviewed by the ISCC at the in-person meeting on 6th November. By 1st November, the Search Committee will confirm a common set of questions to ask the candidates at the ISCC interview.

The committee is informed that all but 3 invoices (these will be issued at a later date when requested by the member state) for the Collaboration contributions for 2024 have been sent out. Payments from ten member states and the institute member Czech IEAP-CTU have already been received. It is unlikely that Greece will fulfil its financial MoU obligations.

S. Freeman informs the committee that the institute membership of the Czech IEAP-CTU will expire at the end of 2024. The ISCC agree to another extension of this membership if requested by the institute. The draft of the institutional agreement with IPEN in Brazil is still under preparation by the office of the CERN Director for Research and Computing.

G. Rainovski explains to the committee that in February 2024 notification was sent to the ISOLDE Collaboration, as well as to certain other experiments at CERN, that Bulgaria will withdraw from the Collaborations as of February 2025. It is still possible that this notification will be withdrawn after a review by the Bulgarian authorities, meaning that Bulgaria will continue as a member of the ISOLDE Collaboration, but no fixed date for the review has been provided.

The committee is informed that the 2024 Financial Review Committee meeting seemed to go well with the funding agencies satisfied in general. For the first time, the ISOLDE Physics Section leader had to report on all ISOLDE Third party Accounts and not just the ISOLDE Collaboration account. This was a lot of work but was perhaps also useful for some experimental setup collaborations. A narrative was presented around the figures to explain expenditure in year against the important consumable demands and any balances carried against important liabilities. S. Freeman clarifies that a Visiting Team Account is used for travel, car rental, Cost of Living Allowances (COLA), CERN stores items etc. for visiting researchers that are not part of the deliverables of an institute to an experiment. A Collaboration Account is for one or more institutes and covers costs associated with running an experiment/instrument and needs an MoU. The committee is told that CERN has expressed a desire to add new instrument MoUs as addenda to the ISOLDE MoU. The ISCC has no objections to this.

S. Freeman summarise the issues that arise regarding publications using data from experiments at ISOLDE with respect to CERN Council's decision to terminate all collaborative agreements (ICAs) with Russian and Belarusian institutes at the end of 2024. All "legacy" publications coming from experiments undertaken before the ICA terminations should satisfy the previous policies over institutes in these countries by using the suggested text in the address lists e.g. "Affiliated with an institute/laboratory covered by a cooperation agreement with CERN at the time of the experiment". ISOLDE experiments may have people who are not listed on the INTC proposal or do not physically come to CERN for the experiment but who still appear on the paper concerning ISOLDE data via contributions to data analysis or theory. If co-authors from Russian or Belarusian institutes are included on papers for experiments done after the termination of the ICAs this would be viewed as breaking the spirit of the CERN Council resolutions. Hence a policy was drafted to flag legacy papers clearly, to avoid publishing papers with ISOLDE data from experiments performed after the termination of the ICAs with co-authors from Russian and Belarusian institutions, and to cease sharing of data with individuals at those institutes. The policy, that was sent to ISCC members in June

2024, will be updated with respect to the CERN Council's recent decision not to terminate ICAs with JINR and then circulated to the ISOLDE collaboration.

The committee is told that the ISOLDE facility and its science programme appears prominently in the April 2024 draft NuPECC Long range plan, being mentioned in both Executive Summary Recommendation sections and in recommendations in individual chapters as well as in the text of chapters. A HIE-ISOLDE storage ring is included in the science chapters.

S. Freemans informs the committee that there will be an update of the European Strategy Roadmap for Particle Physics with a deadline for submitting input in Spring 2025 and the update process concluding in June 2026. The term "Particle Physics" effectively covers all activities at CERN including ISOLDE and last time ISOLDE appeared under the "Diversity Programme". Input on behalf of ISOLDE should be prepared by the ISCC with the submission to the NuPECC LRP a good starting point. It might also be helpful for instrument collaborations to submit something and, as there are national submissions, ISCC representatives should check that ISOLDE in the national discussions that might otherwise only focus on "particle physics".

The committee is informed that, as yet, no formal reply has been received from AGATA management after the ISCC approved response was sent to Angela Bracco about the possibility of locating the AGATA detector at ISOLDE. The committee will continue to emphasise that the AGATA community would need to engage and drive the project and that there are significant challenges.

S. Freeman explains that the collaboration funding technician post has completed the necessary approval steps with the SY Department and CERN HR, and the advertisement will soon go live.

Finally, S. Freemans tells the committee that instrument spokespersons will soon be contacted with a request for information about their LS3 plans in order to ensure that the correct connections to service and resources etc. are available during this period. This will also help to ensure the continuation of fellowships at ISOLDE during the shutdown.

6. News from the ISOLDE coordinator– *H. Heylen*

The ISOLDE running period so far this year is briefly summarised. There has been a total of 18 runs of 13 IS experiments and LOIs with 147 shifts provided. TISD measurements were given 26 shifts and a few hours every few weeks are dedicated to scans to improve the optics model of ISOLDE. Some of the physics highlights during this period are mentioned and the machine supervisors as well as the target and RILIS teams are thanked for their efficient problem solving.

H. Heylen reminds the committee about important safety procedures at the facility. For matters concerning radioactive sources, the Radioactive Source Management Service should be contacted while EP safety is responsible for general safety procedures at ISOLDE. With regard to modifications to regular setups, safety inspections should be planned before scheduled runs and it is important that Users contact EP safety well in advance if there is a possibility of interventions being required during a weekend.

H. Heylen tells the committee that protons will now be available for physics at ISOLDE from 8th April to 25th November in 2024 which is four weeks longer than originally planned. It is hoped to have a period of winter physics until 9th December that would be for low energy experiments only and a separator course is being planned for December. LS3, currently scheduled for 2026 to 2027, will mean no physics at ISOLDE for two years. Even though protons could be made available to ISOLDE mid-2027, the beam dump replacement project will mean no physics at the facility for the whole of 2027. Final approval of LS3 will take place in September 2024 so it is still possible that it could be delayed.

A summary of the outcome of the recent INTC meeting is given. Nine experiments, with a total of 92 shifts, were approved. The distribution of the shift backlog at ISOLDE with respect to experiment setup is presented and the coordinator explains that different experimental collaborations have different ways of prioritising proposals and for the preparation of the ISOLDE schedule priorities are determined in consultation with the collaboration taking into consideration such factors as scientific priorities, equipment availability, PhD students waiting for data and technical developments. The committee is informed that, in order to deal with the mounting backlog of shifts at ISOLDE, the INTC has decided that all experiments will be automatically closed and will have to reapply for shifts during LS3. A discussion takes place about how best to reset shifts without affecting support for experiments and the committee stresses that the backlog of shifts indicates the need for expanding the capacity of the facility. H. Heylen informs the committee that the next INTC meeting will take place 12th to 13th November 2024 and will only be accepted low energy proposals and LoIs while the February 2025 meeting will only take proposals and LoIs for HIE-ISOLDE physics.

7. News from the ISOLDE group– S. Freeman

The present manpower situation in the ISOLDE Physics Group is summarised by S. Freeman:

- Research Fellows = “Senior Research Fellows Experimental and Theoretical Physics (Category 1)”: Simon Lechner – MIRACLS/PUMA (Nov. 2022 – Nov. 2024), Jessica Warbinek – CRIS (January 2024 – December 2025), Monika Piersa-Silkowska - VITO (February 2024 – February 2025 (Previously Marie-Curie Fellow Feb. 2022 – Jan. 2024)), Peter Plattner – COLLAPS (January 2025 – December 2026).
- Applied Fellows = “Research Fellowship In Applied Physics And Engineering (Category 2)”: Carlotta Porzio – MINIBALL (March 2024 – February 2026), Patrick Macgregor – HIE-ISOLDE (Nov. 2022 to Oct. 2025), Michael Pesek - VITO (November 2022 – November 2025), Lukas Nies – MR-TOFs/PUMA (Sept. 2023 – Aug. 2025), Nikolay Azaryan – VITO/ATLAS (December 2023 – November 2025).
- QUEST Fellows = like an Applied Fellow – “project graduate”: Amy Sparks – VITO/medical imaging (May. 2023 – Dec. 2025),
- Scientific Associates: Joakim Cederkäll (Oct 2024 – Sept 2025)
- Corresponding Associate: None
- Doctoral Students: Marcus Jankowski (CERN via Gentner Doctoral Program) (January 2021 to June 2024), Tim Lellinger (CERN via Gentner Doctoral Program) (March 2021 – July 2024), Mateusz Chojnacki (CERN-ERC Betadrop) (July 2021 – June 2024), Iliaria Michelon (CERN via VITO EU+EP Quota) (April 2023 – February 2026), Daniel Paulitsch (CERN via Gentner Doctoral Program) (August 2023 – July 2026).
- Staff Members: Sean Freeman (Physics Group Leader) (August 2021 to July 2025), Magdalena Kowalska (CERN staff member- Senior Research Physicist) (January 2020 -), Mark Bissell (Research Physicist LD)(September 2022 to August 2025), Hanne Heylen (Physics Coordinator) (September 2023 to August 2026).
- User: Jenny Weterings (User Support) ISOLDE Collaboration & University of Oslo (2002-)

The next deadline for fellows and associates applications is September 2nd 2024.

8. Dates of the next meeting

The date of the next ISSC meeting is Wednesday 6th November. This will be an in-person meeting to select the next ISOLDE Physics Group leader/Collaboration Spokesperson.

Meeting ends at 15:00.

N.B. The above presentations can be found via <https://indico.cern.ch/event/1424181/> .