



User Services Newsletter

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A Message from the Deputy Director, Research – Reiner Kruecken

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Dear Friends and Colleagues,

Following on the earlier communication this month, we are providing here an update on the status and plans for the ramp-up of research activities at TRIUMF.

TRIUMF continues to follow provincial and federal guidance, framed in particular by the “Restart Plan” put forward by the Province of British Columbia (BC), which aims to keep social interactions at <60% of normal to keep hospital loads manageable until a viable treatment or vaccine for COVID-19 is developed. The Province continues to encourage work from home to limit workplace “contact number and intensity”, and, when on-site activity is necessary, to reduce employee interactions, e.g. by using staggered shifts or work hours and by forgoing in-person meetings.

Currently, TRIUMF’s is carrying out on-site activities with site occupancy of approximately 30%, including medical isotope production, research beam delivery preparation, as well as various infrastructure and research project activities. Updates can be found below.

TRIUMF is preparing to start isotope beam delivery at the beginning of July with stable beams and with radioactive ion beams at the end of July. μ SR experiments will commence no earlier than mid-August after reconnecting the M9A channel to the T2 production target.

In the coming months we anticipate a gradual ramp up to 50-60% site occupancy as we move towards Phase 3 of the beam delivery/experimental program plan presented in the last Newsletter. The plan continues to prioritize the health and safety of staff and users while enabling cutting-edge science as soon as reasonably possible. Some local users and users from across Canada will be welcome at the lab for the upcoming schedule but with constraints on the number of people on site. The situation for international users remains uncertain and we will update the user community as the situation becomes clearer.

It is important to recognize that for the foreseeable future significant constraints on the number of users on site will remain. To offset this, we will be engaging with the user community and experimental collaborations to enhance remote access and operations capabilities.

On behalf of all of TRIUMF, I would like to extend our best wishes for you and your families during these trying times. Thank you for your support and your patience. When you have an opportunity to come back to TRIUMF, please do so under full consideration of your own health as well as the health of everyone around you. Thank you, and all the best.



Reiner Kruecken

Deputy Director, Research



Beam Schedule Update - Chris Ruiz

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Beam Schedule 138 has been updated to reflect the research ramp up plan presented in the previous Newsletter. It commences with ISAC operations, providing stable beam to experiments starting July 3rd, and radioactive beam to experiments on July 28th, followed by beam to CMMS facilities no earlier than mid-August. The schedule can be viewed here:

<https://mis.triumf.ca/schedule/view?schedule=138&revision=ACTIVE&dateview=entire&weeklater=1&from=2020-04-07&to=2020-10-07&in=all&exp=All&detail=true>

This schedule presents a cautious approach to resuming on-site research that respects the safety of staff and users by minimizing operational complexity, and associated personnel. All scheduled dates are tentative, subject to ever-changing government guidelines in response to the evolving COVID-19 pandemic – significant changes might become necessary at any time.

For ISAC, Schedule 138 now consists of a mixture of beam development and EEC-approved experiments in Nuclear Physics, Molecular & Material Science, and Life Sciences. All beam development is aimed towards high-priority EEC-approved experiments, with some time reserved for general facility improvements benefitting all users. The scheduled experiments were chosen from amongst those in the original (pre-COVID) Schedule 138, where preference was given to those that can be accomplished with *small numbers of local personnel* or a component of *remote running* of the experiment. This is in order to keep personnel on site at the recommended levels while allowing both beam-related and other on-site research and preparation for future beam-time to occur.

At this time, no experiments have been scheduled *requiring* the presence of international users. In principle, out-of-province Canadian researchers are able to participate in their experiments if site occupancy limits still can be respected – please consult your Facility Coordinator for details.

μ SR experiments will commence once repairs to M9 have been completed, which is anticipated to be by mid-August - the schedule will be updated once the exact dates are known. The μ SR experiments in the remainder of Schedule 138 will be run primarily by local users with some remote user-led experiments assisted locally by CMMS staff. The schedule includes experiments in the original Schedule 138. CMMS staff will contact spokespersons shortly to determine whether they are willing and able to run and what their requirements will be.

For any enquiries regarding Schedule 138, please contact either Chris Ruiz – ISAC (ruiz@triumf.ca), Iain McKenzie – CMMS (iainmckenzie@triumf.ca), or Mike Trinczek – PIF & NIF (trin@triumf.ca).

Target and Ion Sources Updates – Alexander Gottberg gottberg@triumf.ca

Between March and May, target and ion source production, as well as ISAC target hall preparation work, was suspended with all infrastructure maintained in a safe state. This has been turned into an opportunity to catch up on project and development tasks and define safe work procedures allowing the return to online operation within the new constraints and challenges dictated by COVID-19.

Target and ion source development is always framed by EEC-approved experiments and Letters of Intent, as well as through a graded priority list maintained by the [ISAC Beam Development Strategy Committee](#). Based on these priorities, research and development continued remotely to an extent that now enables us to foresee two high-impact development online runs in Schedule 138.

1. As far as the situation will allow, a newly developed polyphasic and porous carbon target will be studied online at ISAC. Studies of this first target in 2020 will include the release properties and achievable isotope intensities for ${}^7\text{Be}$ as well as ${}^8,9\text{Li}$ isotopes at proton beam intensities up to $100\ \mu\text{A}$. These isotopes are requested by a number of experiments and are typically produced via reactions in high-Z nuclides, such as uranium and tantalum, where large stopping powers and significant post-irradiation isotope inventory limit the possible proton intensity and longevity. In the future, this target may also be applicable for ${}^8\text{B}$ isotope beams.
2. In September, the first online tests of a [proton-to-neutron converter target](#) (S1795) in collaboration with the TITAN MR-TOF. This exciting target design will enable the delivery of very pure neutron-rich fission products at high intensity at ISAC.

As both targets will receive high-power proton beam (up to $100\ \mu\text{A}$) several shifts have been allocated to characterize the target station and beam dump systematically, in particular high-voltage performance and power management, under various beam conditions. Running these development targets in the upcoming beam schedule will increase future ISAC RIB capabilities, while offering the opportunity for low complexity and flexible beam delivery involving only local users.

With no staff on site, work on CANREB commissioning was also stopped in March, with the exception of some limited work on electrical, diagnostics and remote work on controls issues. The ISAC beamline infrastructure has been connected to the ARIEL-CANREB beamlines to allow for the commissioning of the ARIEL yield station and future use of CANREB infrastructure with first RIB.

Since the beginning of June, work is ramping up again on further optimization and characterization of the CANREB EBIS. Commissioning work continues with stable ions from OLIS, and radioactive ion beams of alkaline metal isotopes from a uranium carbide target scheduled for July and August 2020 ([S2003](#)).



Proton and Neutron Irradiation Facilities (PIF & NIF) – Mike Trinczek
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Beam irradiation activities, which had to be suspended due to the ongoing COVID-19 pandemic, are being ramped up according to the schedule outlined below:

[May and June 2020](#)

During this period the PIF & NIF team was practicing working together safely while respecting the COVID-19 guidelines imposed by the Province. Lessons that were learned will be used to inform customers and users once beam time is again available. To support user safety, a check list of what needs to be regularly cleaned, given typical use cases, was also being developed. Discussions with customers were undertaken to help redefine testing plans so that some components can be sent to TRIUMF for testing by the PIF & NIF team.

After the TRIUMF shutdown was completed and cyclotron beam became available, both the 1B and 2C1 beam lines were turned on and commissioned, which included ensuring that beams had proper alignment, size, and position, and any equipment problems that emerged were corrected. Once commissioned, beam was used to characterize a new SRAM detector.

Work with the TRIUMF Beam Development team resulted in the extraction of ~200 MeV protons in beam line 1B, potentially giving PIF & NIF an additional future capability.

[July and August 2020](#)

If beam becomes available in July and August, the plan is to start the testing program, initially only with experienced local and Canadian users subject to a two-person limit. In all cases, the plan is to go slowly and allocate extra time so no irradiation will be rushed. Guidelines could change at any time due to the evolving pandemic, so reasonable expectations must and will be clearly communicated to all customers.

The current plan is to use the 2C1 beam time during the first week of July for:

1. TRIUMF BAE and PhD student to test with fibres
2. PIF & NIF team to irradiate components on behalf of a Canadian company
3. Regular user from Ontario to test satellite components

Work towards the startup of TNF will be subject to the availability of the 1A beamline, anticipated no sooner than mid-August, at which point further beam schedule adjustments will be made.

As for TRIUMF in general, access for international customers and users will depend sensitively on guidance from government authorities, and updates will be communicated as they arise.

Life Sciences – Cornelia Hoehr

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All research activities had been suspended since March in line with the site-wide priorities. Only essential work to supply medical isotopes for clinical use to BC Cancer was still active. This required having the TR13 cyclotron and related chemistry equipment to be on stand-by.

In Phase 2, research in all chemistry and radiochemistry laboratories on site at TRIUMF has begun, at the moment limited to local experimenters. Currently, 11 LSPEC-approved experiments and several infrastructure projects are moving forward, but in stages. The isotopes available for these projects are presently F-18, Ti-45, Zr-89, Sb-119, Lu-177, Hg-197, and Ac-225. Several of these experiments are supported by the production of medical isotopes by the TR13 cyclotron; as more experiments are ramped up, the list of available isotopes will be expanded accordingly.

Following site-wide COVID-19 regulations to ensure safe work practices, the maximum number of experimenters at any given time is currently limited in each lab. To accommodate the largest number of users, experimenters are considering working in morning and afternoon shifts and on the weekend.

The selection of the experiments took and will take into account the status of the required infrastructure, the involvement of graduate students and postdocs, deadlines for grant submissions and reports, and the training status of the chemists.

Scheduling of research activities is organized by the deputy ALD for research (Cornelia Hoehr) in close consultation with the lab managers (Vicky Hanemaayer, Stuart McDiarmid and Qing Miao). Expansion of our research program in the coming weeks will follow the site-wide plan described in the previous Newsletter.

Centre for Material and Molecular Science - Iain McKenzie

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The start of μ SR experiments will be delayed until at least mid-August due to the necessity of completing the M9/T2 repairs. This will allow for commissioning of the M9A beam line and keep the M9H CFI project on track.

The remainder of Schedule 138 (mid-August until the end of September) will be filled with experiments that originally requested time in Schedule 138 run primarily by local users with a smaller fraction of remote users. CMMS staff will be contacting spokespersons in order to determine whether they are able to run and what requirements they have. LAMPF will run on M20 as usual and we will determine what spectrometer is to be installed on M15 after consultation with our users. The μ SR schedule will be released in mid-July once we have more information about the progress of the M9/T2 repairs.

Remote access will involve greater collaboration between our international users and CMMS staff. CMMS facility members will change samples, troubleshoot and give guidance about running remotely. Restrictions for the remotely run experiments would apply, including:

- No changing samples outside of regular TRIUMF working hours.
- No complicated sample handling. i.e. we will be unable to deal with loose powders or air-sensitive samples.
- No complicated experimental setups or procedures. We will be unable to perform labour-intensive procedures such as accurately zeroing the magnetic field in the DR or setting up experiments with external stimuli (currents, RF etc.).

In view of the demands on CMMS staff time, we will limit the remote access experiments to approximately 1/3 of the available beam time. CMMS staff will discuss the experiments with spokespersons to determine whether it is feasible for them to run remotely.

The β NMR with lithium-8 is scheduled to run from August 30 to September 15 with experiments which were originally scheduled for the cancelled April beam time. All of these experiments have local spokespersons. It is not possible to run β NMR experiments remotely due to their more complex nature compared with μ SR experiments.

Scheduling for the fall 2020 beam period will depend on the progress of the COVID-19 pandemic. We will release the fall 2020 μ SR schedule in mid-September after we have assessed that start-up of the experiments and the impact of remote experiments.

END

Given the dynamic nature of the pandemic, it is important for all users to remain up to date with the latest site-wide communications. Users are invited to check the TRIUMF COVID-19 webpage regularly (<https://www.triumf.ca/COVID-19%20RESOURCES>) for important updates.

If you have any questions or concerns regarding the research ramp-up plan, please do not hesitate to reach out to Marcello Pavan (Head, User Program) at marcello@triumf.ca