

WP9 Overview

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<https://indico.cern.ch/e/radnext-2024>



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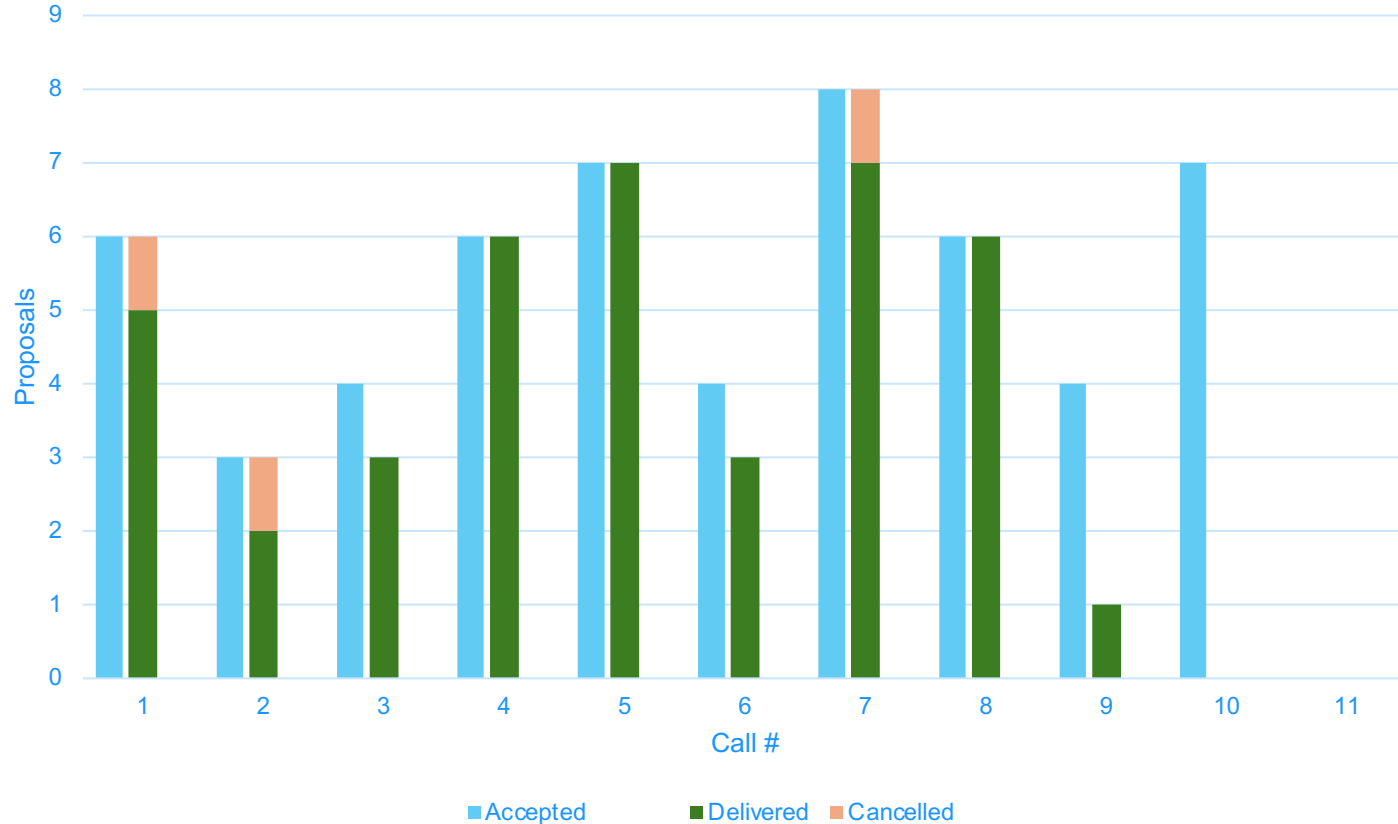
WP9 facilities: neutrons, muon, mixed-field

Facilities	Beam type and energy range	Flux (s ⁻¹ cm ⁻²)	Yield (s ⁻¹)	Production mechanism	Country
Chiplr (UKRI)	Atmospheric neutrons	6 · 10 ⁶	-	Spallation (up to 800 MeV)	UK
TNF (TRIUMF)	Atmospheric neutrons	5 · 10 ⁵ - 3 · 10 ⁶	-	Spallation (up to 500 MeV)	CA
FNG (ENEA)	14 MeV (or 2.5 MeV) neutrons	-	10 ¹¹	DT (or DD)	IT
Fraunhofer INT (INT)	14 MeV (or 2.5 MeV) neutrons	-	10¹⁰	DT (or DD)	DE
NESSA (UU)	14 MeV (or 2.5 MeV) neutrons	-	4 · 10¹⁰	DT (or DD)	SE
CNRS-LPSC	14 MeV (or 2.5 MeV) neutrons	-	8 · 10 ⁹	DT (or DD)	FR
PTB	monoenergetic neutrons up to 20 MeV	10 ³ - 10 ⁸	-	Nuclear reactions	DE
NPI-CAS	quasi-monoenergetic neutrons up to 30 MeV	10 ³ - 5 · 10 ⁸	-	⁷ Li(p,n)	CZ
GANIL-SPIRAL2 (GANIL)	quasi-monoenergetic neutrons up to 30 MeV		-	⁷ Li(p,n)	FR
ILL	Thermal neutrons	3 · 10 ⁹	-	Nuclear Reactor	FR
EMMA (UKRI)	Thermal neutrons	2 · 10 ⁶	-	Pulsed, spallation moderated	UK
NPI-CAS	Low+intermediate energy white beam neutrons	10 ¹¹ - 10 ¹²	-	Be converter	CZ
GANIL-SPIRAL2 (GANIL)	Low+intermediate energy white beam neutrons	10 ¹¹	-	Be converter	FR
PTB	Low+intermediate energy white beam neutrons	10 ⁸	-	Be converter	DE
nELBE	Low+intermediate energy white beam neutrons	5 · 10 ⁷	-	Photoproduction: ~1 MeV (100 keV - 10 MeV)	DE
CHARM (CERN)	Mixed field	Varies by position		Spallation (24 GeV protons)	CH
RAL-RIKEN (UKRI)	Muons 60 MeV/c	7 · 10 ⁴		Pion decay	UK

Beam delivery progress by TA call (1)

- TA call #1 status: 6 accepted proposals, 5 delivered, 1 cancelled by RADNEXT
- TA call #2 status: 3 accepted proposals, 2 delivered, 1 cancelled by user
- TA call #3 status: 4 accepted proposals, 3 delivered, 1 pending due to facility
 - #9 @RIKEN-RAL (muons)
- TA call #4: 6 accepted proposals, 6 delivered
- TA call #5 status: 7 accepted proposals, 7 delivered
- TA call #6 status: 4 accepted proposals, 3 delivered, 1 w/ status to be clarified
 - #143 @CHARM
- TA call #7 status: 8 accepted proposals, 7 delivered, 1 cancelled by RADNEXT
- TA call #8 status: 6 accepted proposals, 6 delivered
- TA call #9: 4 accepted proposals, 1 delivered, 1 pending beam, 1 pending due to users, 1 pending due to facility
 - #289 @ RIKEN-RAL (muons)
 - #300 @ ChiplR – beam cancelled twice by users
 - #303 @ FNG
- TA call #10: 7 accepted proposals, 6 confirmed or scheduled, 1 facility match stage, 2 w/ reviews pending
 - #327 @ CHARM
 - #337 @ CHARM
 - #325 @LPSC (tentatively)
- TA call #11: 3 proposals under review

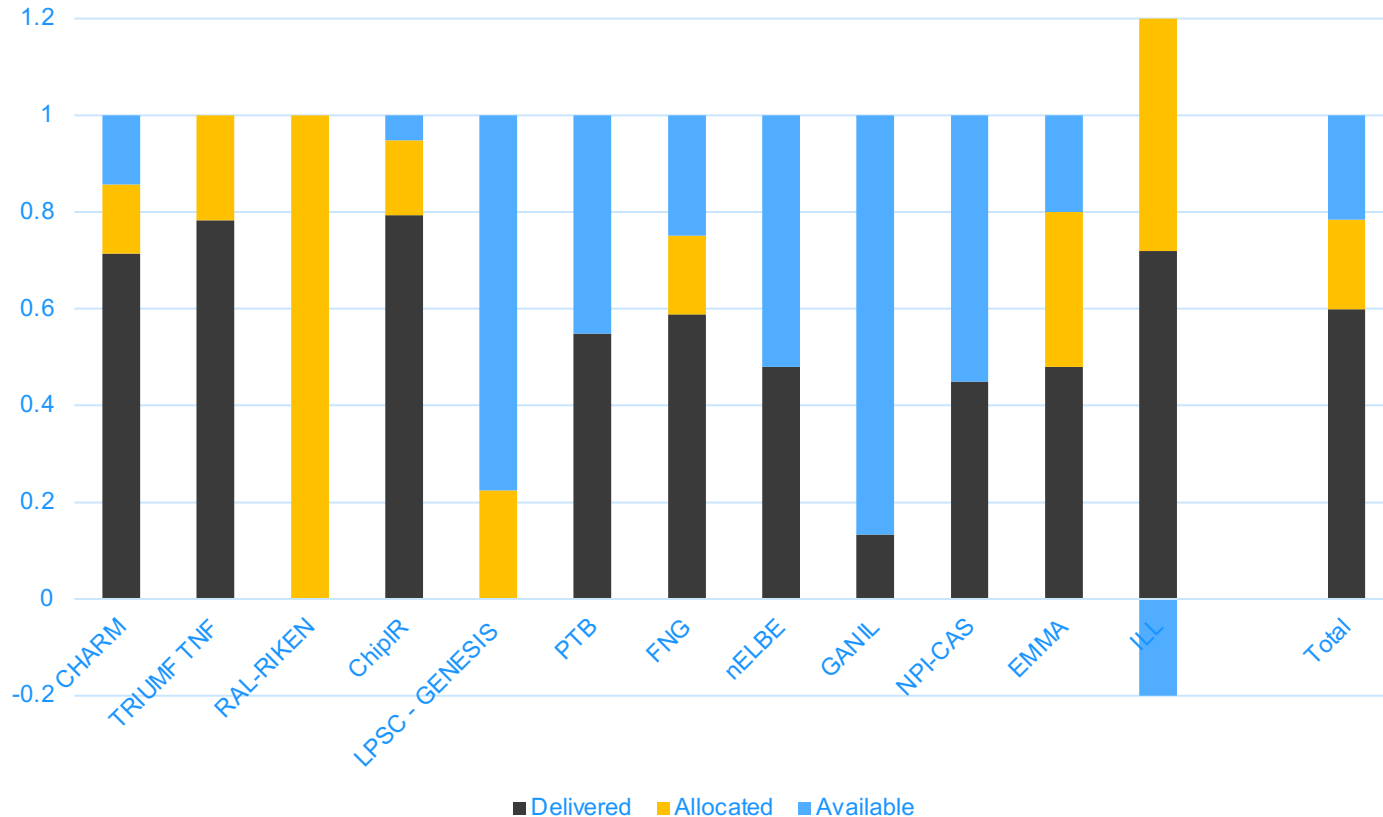
Beam delivery progress by TA call (2)



Beam delivery progress by facility (1)

Facility	Original hours	Modified hours	Completed	Allocated	Remaining
CHARM	800	1176	840	168	168
TRIUMF TNF	92	92	72	20	0
RAL-RIKEN	140	140	0	140	0
ChipIR	620	620	492	96	32
LPSC - GENESIS	160	160	0	36	124
PTB	90	175	96	0	79
FNG	530	530	312	86	132
nELBE	150	150	72	0	78
GANIL	90	90	12	0	78
NPI-CAS	80	80	36	0	44
EMMA	150	150	72	48	30
ILL	100	100	72	48	-20
Total	3002	3463	2032	650	781

Beam delivery progress by facility (2)



Beam delivery progress by facility (3)

- 60% of revised beam commitment delivered, 78% delivered+allocated.
 - 69% delivered, 90% delivered+allocated compared to initial total number of hours, but biased by the large increase in hours CHARM agreed to deliver compared to original commitment. Those hours have no effect on budget as they are provided at no cost to RADNEXT.
- As expected, atmospheric neutron beams are in high demand and have very limited remaining availability. Lots of 14 MeV beam delivered.
- Typical time between proposal accepted and delivery is around 6-8 months.
- Cannot assign France-affiliated users to GANIL/LPSC – few other matching proposals.
 - 2 proposals accepted at LPSC were cancelled/rejected by the user.
- Other facilities with low allocated beam hours (nELBE, NPI-CAS) are due to low demand for those beam types.
- PTB initial commitment of 90 hours allocated within first 5 calls, total allocation raised to 175 hours by budget transfer but no matching proposals in last 5 calls.
- Unable to deliver muon beam at RAL-RIKEN so far:
 - Clarify timeline to availability at RAL-RIKEN? in 2025?
 - Move muon experiments to M20 at TRIUMF? (28.5 MeV/c surface μ^+ beam, flux $5.5E5/s$, must be scheduled together as one block, earliest availability August 2024, then at irregular intervals in Oct-Nov 2024, and likely June-Nov in 2025).

Additional remarks from WP9

- User readiness to schedule beam has improved in recent calls, but timely execution continues to be a challenge
 - Anecdotally, long delays are more often due to users than facilities
- User teams usually well prepared for their beam once experiment can be scheduled
- Lack of integrated tracking and reporting tools in the portal and/or shared between WP3 and WP9/10 will probably make final few calls more challenging to manage, especially with the extended duration
 - Remaining beam hours per facility, or budget per facility are critical to avoid budget overruns
 - Not always clear if facilities track their used/billed hours differently than what is granted and tracked by WP9 and listed in the portal (on each proposal, no central overview)
 - P2 reporting might be a good point to assemble the necessary data and work from there...
 - Additional support in portal or an internal checkpoint within P3 reporting period would help

Conclusion

- WP9 progress in delivering beam is roughly as could be expected with 1 year to go in the original RADNEXT timeline
- WP9 will run into issues with its ability to accept proposals and match them with facilities soon as only few beam types will remain available
- All beam types except muons have been delivered to users
- All but 2 of the facilities with ongoing commitments to RADNEXT have hosted an experiment
 - RAL-RIKEN (muons)
 - LPSC (DD/DT neutrons)

Thanks for your attention!



Image Source: CERN