

JYU's updates for RADEF facility

Arto Javanainen (JYU)

Heikki Kettunen (JYU)

RADNEXT 3rd Annual Meeting – 10-11 June 2024

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



This project has received funding from the European Union's Horizon
2020 research and innovation programme under grant agreement No
101008126

RADNEXT 3rd Annual Meeting – 10-11 June 2024

Outline

- RADEF Facility intro
- RADNEXT Beam Time Status @ RADEF
- Feedback
- Suggestions/thoughts for the future “RADNEXT2.0”

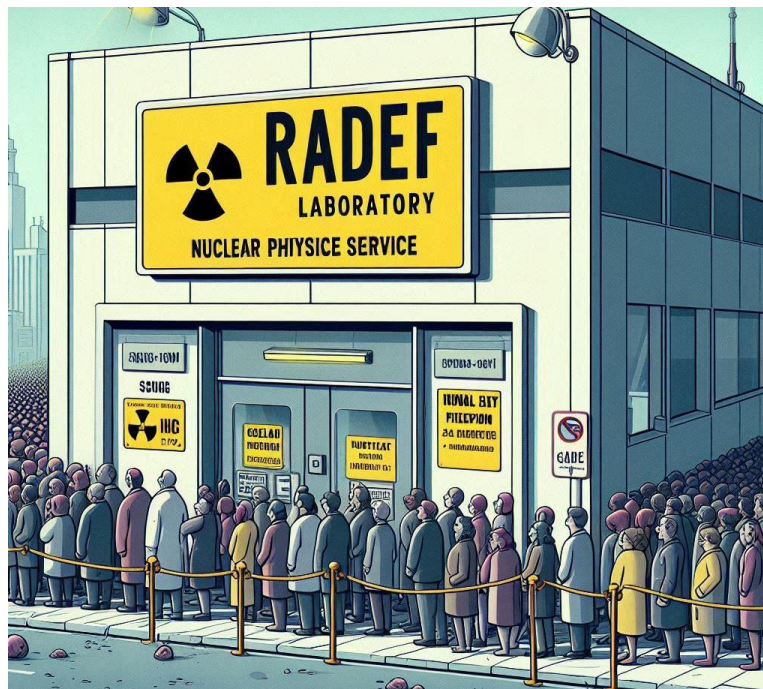
RADEF Facility

- <https://www.jyu.fi/accelerator/radef>
- @ Accelerator Laboratory of University of Jyväskylä, Finland
- Heavy-ion cocktails
 - (9.3) / 10.0 / 16.3 / 22 MeV/u
- Protons
 - Up to 55 MeV

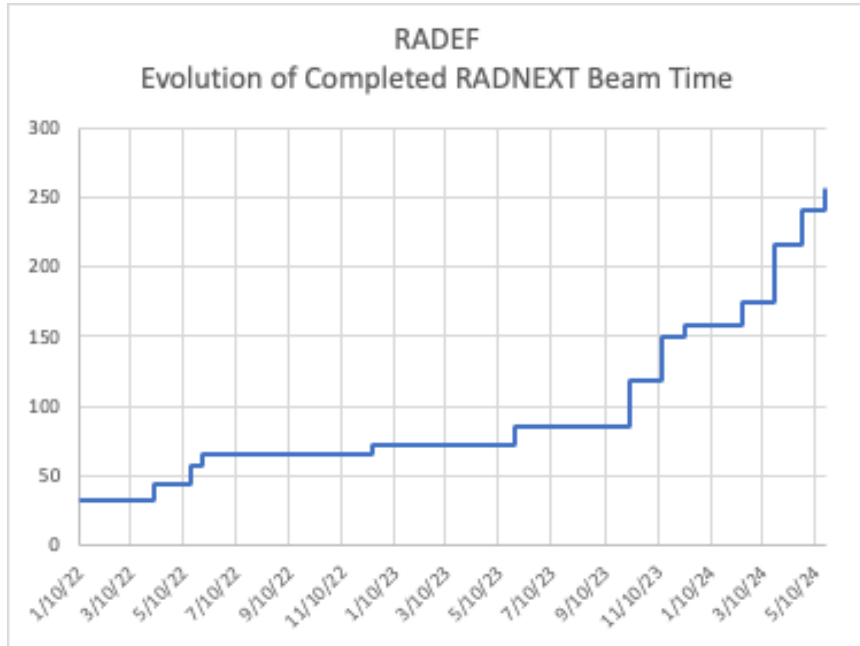


RADNEXT Beam Time Status

- Total quota of 300 hours to be provided
- Status until May 2024
 - 280 hours allocated
 - 20 hours remaining from the quota
 - 256 hours completed
 - 35 hours (14%) for protons and 220 hours (86%) of heavy-ions



RADNEXT Beam Times at RADEF



- Slow start with some user cancellations
- Currently good progress
- Planned quota will be filled

Breakdown of beam time status (until May 2024)

Proposal title	RADNEXT-code	Beam type	Hours Allocated	Hours completed	Date	number of days	booked/complete	Notes	Number of people visited	User support provided	Access cost	Total cost incurred	test report
Rad tolerant Power Systems for the HL-LHC, RaPSyHill	TA01_30	Proton (HE)	33	33	1/10/22	2	complete			0.00 €	9,702.00 €	9,702.00 €	https://zenodo.org/record/6594609
SEEs in Silicon Photonics	TA02_03	Heavy-ion	8	8	12/16/22	1	complete		1	0.00 €	2,352.00 €	2,352.00 €	
Proton testing of soft processor-based SoCs targeting low-power space missions, spSoC-Lpspace	TA02_08	Proton (HE)	12	12	4/7/22	1	complete			0.00 €	3,528.00 €	3,528.00 €	https://zenodo.org/record/6966053
Heavy ions SEE testing of Cobham NOEL-V with RTG4 FPGA	TA02_16	Heavy-ion	12	12	5/18/22	1	complete			0.00 €	3,528.00 €	3,528.00 €	https://zenodo.org/records/8210979
Integrated Sensor Interface for Harsh Radiation (ISHR)	TA03_03	Heavy-ion	8	8	5/31/22	1	complete		1	708.60 €	2,352.00 €	3,060.60 €	https://zenodo.org/records/7744361
Latch-Up Current Limiter and Telemetry ASIC – SEE Testing and Characterization	TA04_64	Heavy-ion	REMOVED				1	REMOVED from the list			- €	- €	
Qualification of the ULTRASAT sensor for single event upset and latch-up immunity	TA04_84	Heavy-ion	13	13	5/29/23	1	complete		3	0.00 €	3,822.00 €	3,822.00 €	https://zenodo.org/records/8408354
Sensitivity of High Voltage Power GaN Transistors to Heavy Ions (SaGaN)	TA05_120	Heavy-ion	REMOVED					REMOVED from the list			- €	- €	
Radiation and Investigation of Memory-based Devices under Heavy Ions (RIMEDHIC)	TA06_133	Heavy-ion	32	32	10/9/23	2	complete		3	1,554.00 €	9,408.00 €	10,962.00 €	
Estimation of Single Event Upset cross section using different shift register in bulk 16nm Fin-FET technology with RHBD technique (SEU16)	TA05_99	Heavy-ion	CANCELLED				1	CANCELLED by spokesperson			- €	- €	
Reliability of AI hardware accelerators for Deep Space Exploration (RAID)	TA05_93	Heavy-ion	32	16	2/15/24	1+1	16/32h done	another 16 h on June 1st 2024	2	206.00 €	4,704.00 €	4,910.00 €	
Calibration of silicon-solid state detector for heavy-ion beam characterization and plasma-effect based Pulse Shape Discrimination	TA06_134	Heavy-ion	32	32	11/14/23	2	complete		2	0.00 €	9,408.00 €	9,408.00 €	
Heavy Ion test beam with Demonstrator ASIC for Radiation-Tolerant Transmitter in 28 nm CMOS	TA08_211	Heavy-ion	8	8	12/12/23	1	complete		3	790.00 €	2,352.00 €	3,142.00 €	
Radiation Hardened ASIC Telecommand Interface for Space Applications	TA08_236	Heavy-ion	16	16	5/22/24	1	complete		1	445.00 €	4,704.00 €	5,149.00 €	
Experimental Verification of Destructive Single-Event Effects in Silicon Carbide Power Devices	TA08_266	Heavy-ion	42	42	3/23/24	2	complete		3	1,479.00 €	12,348.00 €	13,827.00 €	
Micro-Electronics Radiation response variability for COTS devices Used in harsh Radiation environments (MERCUR)	TA09_281	Heavy-ion	20	12	4/25/24	1	12/20 h done	another 8h in oct/2024	4	801.00 €	3,528.00 €	4,329.00 €	
A 2.56GHz Radiation Hardened All Digital Phase Locked Loop	TA09_286	Heavy-ion	12	12	4/24/24	1	complete		3	375.00 €	3,528.00 €	3,903.00 €	
			280	256						6,358.60 €	75,264.00 €	81,622.60 €	
	Budget		300	300	hours				Budget	15,300.00 €	88,200.00 €	103,500.00 €	
	Remaining		20	44	hours				Remaining	8,941.40 €	12,936.00 €	21,877.40 €	

Feedback

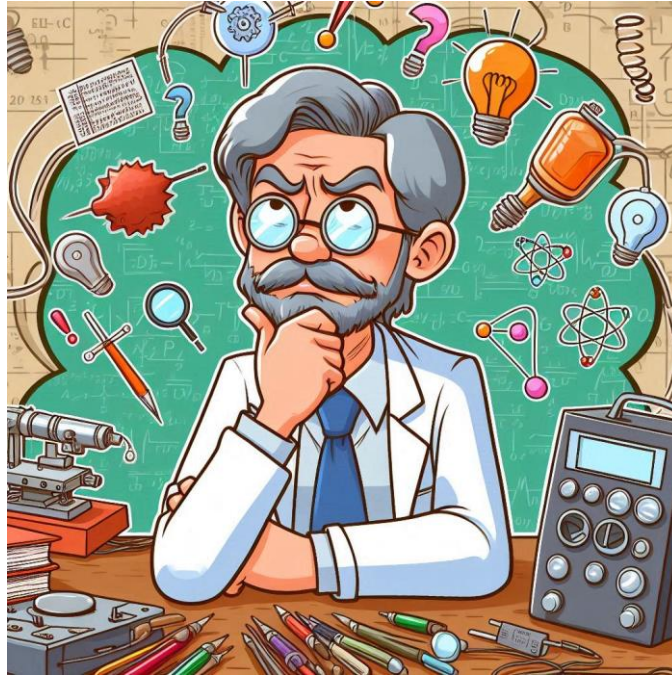


Last minute cancellations

- Extra hassle for the facility without any penalty to the user
- Lost “income”



Something to think for “RADNEXT2.0”



Incentive for the facilities?

- From a “conventional” facility’s point of view
- How to ”compensate”?
 - Beam time offered at “discounted rate”
 - Some extra work compared to “normal” users
- Peer-review publications
 - Current outcome: *Very few, if any*
 - Requirement for users to include facility people in the publications?
 - Not just recommendation



How to handle last minute cancellations?

- Some consequences for the user for cancelling “too late” (or not showing up)?
- Not clear what it should be



THANK YOU FOR YOUR ATTENTION

arto.javanainen@jyu.fi

Facility inquiries:
heikki.i.kettunen@jyu.fi

