

Tritium Laboratory Karlsruhe

30 years

23rd May 2023
ceremonial act

24th & 25th May 2023
symposium on tritium
science & technology

Book of abstracts



Wednesday, May 24th

09:00	B 401	R 410	Welcome
09:10	B 401	R 410	Neutrino physics with Tritium and atomic sources: Session 1
09:10	Hamish Robertson		Tritium and the Mass of the Neutrino
09:45	Sebastian Böser		Towards an atomic tritium source for Project 8
10:10	Michael Sturm		Operation of the KATRIN molecular tritium source
10:35	B 401	R 410	Coffee break
10:55	B 401	R 410	Neutrino physics with Tritium and atomic sources: Session 2
10:55	Ruben Saakyan		Determination of absolute neutrino mass using quantum technologies
11:20	Nicolo de Groot		Tritium for cosmic neutrino detection with Ptolemy
11:45	Marco Röllig		Paving the Way: Towards an Atomic Tritium Source for KATRIN
12:10	Alec Lindman		Practicalities of Atomic Tritium for Project 8
12:35			Discussion / Perspectives
13:00	Casino		Lunch break
14:00	B 401	R 410	Poster session
15:00	B 401	R 410	Short break

15:15	B 401	R 410	Tritium and dark matter experiments
15:15	Michelle Galloway		Tritium traces in rare-event search experiments
15:40	B 401	R 410	Short break
15:50	B 401	R 410	Fusion R&D – Fuel Cycle/Materials: Session 1
15:50	Francisco Alberto Hernandez Gonzales		The Breeding Blanket, the Core of a Thermonuclear Fusion Reactor. Technology, EU Concepts and Perspective
16:25	George Ana		Activities in support of ITER/DEMO
16:50	Alessia Santucci		ENEA activities in tritium recovery and processing for DEMO fuel cycle and blanket
17:15	B 401	R 410	Coffee break
17:35	B 401	R 410	Fusion R&D – Fuel Cycle/Materials: Session 2
17:35	Christoph Kirchlechner		The Tritium Research in the Fusion Materials Laboratory
18:00	Knut Amis		The Research Training Group GRK 2721: Hydrogen Isotopes
18:25	Florian Priester		Sieverts' constant for H ₂ /D ₂ /T ₂ in eutectic PbLi
18:50			Discussion / Perspectives
19:15			Walk to Dinner
19:30	B 451	Tent	Dinner

Thursday, May 25th

09:00	B 401	R 410	Tritium processing (experience and lessons learned)
09:00	Xavier Lefebvre		Experience/Lessons learnt during DTE2 in AGHS
09:30	Ian Castilo		Tritium Processing Experience at Canadian Nuclear Laboratories (CNL)
10:00	Stefan Welte		Development & Operation of the TLK tritium loop
10:30	Robert Michling		The ITER Tritium Plant – Operation and Analytical Needs
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11:00	B 401	R 410	Coffee break
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11:20	B 401	R 410	Tritium analytics and application
11:20	Robin Größle		Tritium Analytics in the powers of ten
11:45	Christian Grisolia		Outcomes of the TRANSAT (Transversal actions for tritium) EU project
12:10	Yuji Hatano		Tritium Research Activities in Hydrogen Isotope Research Center, University of Toyama
12:35	Helmut Telle		Raman spectroscopy of tritiated molecules: the Good, the Bad and the Ugly
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13:00	Casino		Lunch break
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14:00	B 401	R 410	Poster session
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15:00	B 401	R 410	Short break
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15:10	B 401	R 410	Discussion & Perspectives
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Wednesday, 24th May

In addition, part of the project deals with radiotoxicity, radioecology, radiobiology and dosimetry on tritiated particles produced during dis-

mantling, whose impacts have never been addressed before. The results of these activities will be also presented.

Tritium Research Activities in Hydrogen Isotope Research Center, University of Toyama

Yuji Hatano (University of Toyama), Masanori Hara (University of Toyama), Masao Matsuyama (University of Toyama)

Hydrogen Isotope Research Center (HRC), University of Toyama, Japan has been licensed to use 8 TBq of tritium per day. This handling capability of tritium allows to perform investigations on tritium measurements, tritium-material interactions and preparation of tritiated targets for nuclear reaction studies. The objective of this presentation is to introduce several tritium measurement techniques developed in HRC together with recent activities on tritium target fabrication.

β -ray induced x-ray spectrometry (BIXS) has been developed in HRC [1]. The escape depth of β -rays from tritium in a solid are just a few hundred nanometers to a few micrometers, depending on density of the solid. Hence, it is difficult to measure tritium content in a solid and that in gas and liquid phases from outside of a container by β -ray counting. Nevertheless, interactions between β -rays and matters result in generation of bremsstrahlung and

characteristic x-rays. Because of far larger escape depths of x-rays than β -rays at the same energy, tritium content in a solid sample can be evaluated by x-ray measurements. Non-destructive depth profiling is possible by analysing x-ray spectrum with consideration of generation and attenuation of x-rays in a sample. A thin beryllium windows covered by high-Z material layer allows the evaluation of tritium content in gas and liquid phases from outside of the container.

HRC also developed a high sensitivity calorimeter capable to evaluate the amount of tritium as low as 40 MBq [2]. In Japan, the amount of tritium allowed to handle without control by regulations is limited to be less than 1 GBq. However, it is difficult to evaluate and control tritium content in imported products. This calorimeter is helping the security authority of Japan via non-destructive measurement of tritium content in imported products.