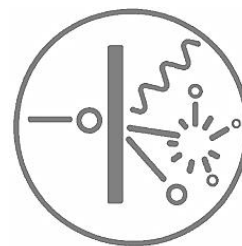


**30<sup>th</sup> Conference of the International Nuclear Target Development Society  
INTDS 2022**

**25 – 30 September 2022**

**Paul Scherrer Institut Villigen PSI, Switzerland**

**3<sup>rd</sup> Announcement**



Dear participants of the INTDS2022,

We are getting close to the 30<sup>th</sup> conference of the International Nuclear Target Development Society. After this long period of cancelled, postponed or online conferences, PSI is pleased to host this conference as an in-person-event. All the more we can now look forward to a variety of new and exciting presentations from the broad field of target production.

The sessions will include contributions on the development of new target preparation methods, advances in target characterization, recent results in the production of targets for medical applications, gas targets and much more. It is particularly gratifying that we have been able to establish a session on new developments in high-power target technology again this year. We will also hear news about targets for ion beams and recent research results in the field of stripper films.

Besides the broad field of stable targets, which will be covered in two sessions, radioactive targets play an essential role in many areas of nuclear research. In addition to the targets themselves, there is an increasing demand for the availability of radioactive substances. Therefore, we have included both a special session on isotope production and one on actinide target production.

INTDS places special emphasis on supporting young scientists. This concern is reflected both in the financial support and in the large number of contributions from students. To emphasize the importance of teaching, a special session on educational topics has been established.

Finally, I would like to thank all the sponsors, whose generous donations helped to put together an interesting and varied social program, starting with a Welcome reception on Sunday evening. On Wednesday afternoon, we will visit the beautiful city of Lucerne and, after a guided tour of the city, enjoy a typical Swiss dinner during a boat trip on Lake Lucerne. A visit to the PSI accelerator facilities is scheduled for Friday morning.

In the following, you will find the preliminary program as well as useful information. For further details, please visit the conference webpage [30<sup>th</sup> Conference of the International Nuclear Target Development Society INTDS 2022 \(25-September 30, 2022\): General Information · Indico \(psi.ch\)](https://www.psi.ch/indico/INTDS2022).

D. Schumann (Chair)

### Useful information

## How to get to the conference site

The conference will take place in the PSI Auditorium lecture hall, 5232 Villigen PSI, Forschungsstrasse 111.

The site can easily be reached by public transport. It takes around 30 min to get there from most of the surrounding towns and villages, for instance from Zurzach, Brugg or Baden. For timetables see: [The SBB online portal for trains and public transport](#) | SBB.

A special shuttle will be provided from the Hotels in Zurzach.

### Departure from Zurzach

Meeting point: "Therme Zurzach"

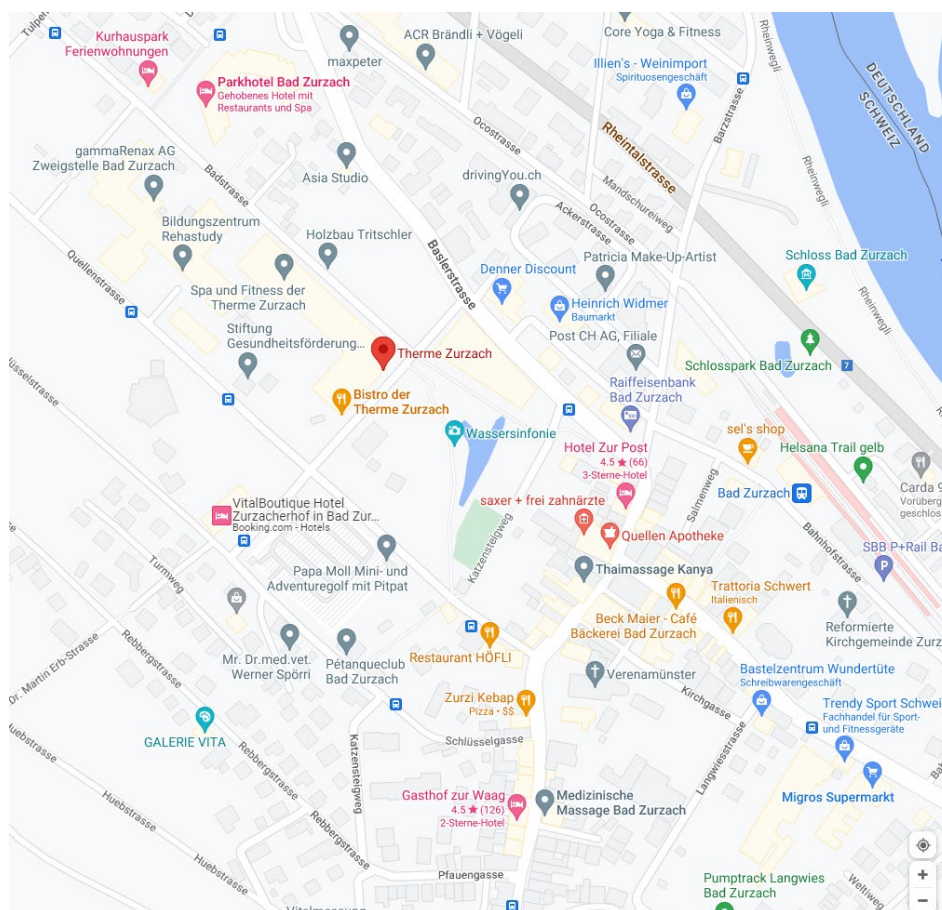
Sunday	25.09.2022	17:30
Monday	26.09.2022	08:00
Tuesday	27.09.2022	08:15
Wednesday	28.09.2022	08:15
Thursday	29.09.2022	08:15
Friday	30.09.2022	08:15

## Departure from PSI

Meeting point: "Bus Stop PSI West"

25.09.2022	21:00
26.09.2022	18:00
27.09.2022	17:30
28.09.2022	
29.09.2022	18:00
30.09.2022	

Meeting point in Zurzach for the shuttle bus



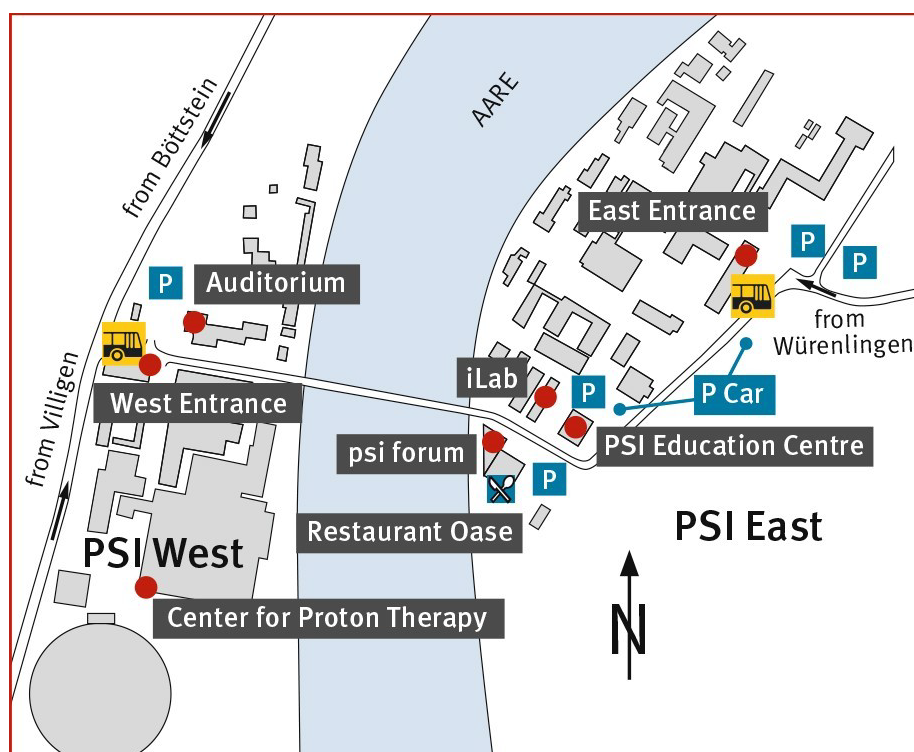
## Conference fee and Catering

The conference fee includes the participation in the Welcome reception, the excursion including dinner and beverages as well as Lunch and Coffee breaks.

Coffee, tea, water and little things to eat will be provided during the coffee breaks. Lunch buffets will be served in the tent nearby the auditorium on Monday, Tuesday and Thursday. On Wednesday, every participant will get a Lunch box for the bus trip to Lucerne. Vegetarian food is available.

## Social events

Sunday	25.09.2022	18:00	Welcome reception at PSI restaurant OASE
Wednesday	28.09.2022	13:00	Excursion to Lucerne; Boat trip and dinner at Luke Lucerne Meeting point "Bus Stop PSI West";
Friday	30.09.2022	11:00	Visit of the accelerator facilities; Meeting point "Outside Auditorium"



## Presentations

All speakers are kindly requested to upload their talks at the registration desk well in advance. For those who are scheduled for Monday, 26.09.2022 morning, please provide the talk already on Sunday, 25.09.2022, during the Welcome reception, if possible.

Invited speakers have a time slot of 30 min including discussion; speakers with contributed talks have 20 min including discussion. Please try to be on time to avoid delays in the schedule.

## **Internet**

WLAN access will be provided for the entire duration of the conference. The username and passcode will be given at the beginning of the conference.

## **INTDS membership and elections**

With participation in the 30<sup>th</sup> Conference of the International Nuclear Target Development Society INTDS2022 you have the opportunity to become a member of the INTDS (<https://www.intds.org/>) until the next INTDS-conference in 2 years without further payment.

With this membership, you get access to the restricted INTDS membership area with extensive information on target development. Additionally, you are entitled for the election of new board members that will take place in the membership meeting on Thursday, 29.09.2022, 16:10. Information on the candidates and the ballots for the election will be provided together with the conference material at the registration. Ask at the registration desk for more information if necessary.

## **COVID19**

Currently, Switzerland does not have any restrictive measures regarding the pandemic. We will keep all participants informed on short notice in case of changes. All necessary measures will be taken in a timely manner should this occur.

## **Emergency**

In case you have urgent questions or serious problems on site, please contact Dorothea Schumann or Mario Veicht, either by e-mail ([dorothea.schumann@psi.ch](mailto:dorothea.schumann@psi.ch), [mario-aaron.veicht@psi.ch](mailto:mario-aaron.veicht@psi.ch)) or call 0041 76 337 3676 – Dorothea; 0041 76 237 6007 – Mario.

## Program

### Sunday, 25.09.2022

- 17:30-18:00 Registration (OASE/PSI)  
18:00-21:00 Welcome reception (OASE/PSI)

### Monday, 26.09.2022

- 8:30-9:00 Registration (Foyer of the Auditorium)  
9:00-9:30 Welcome: A. Pautz (Head of the NES department), C. Stodel (President of INTDS), D. Schumann (conference chair)

#### Session: Target characterization (chair: K. Eberhardt)

- 9:30-9:50 Targetry of rare isotopes at PSI (E. A. Maugeri, PSI, Switzerland)  
9:50-10:10 Thickness and uniformity analysis of thin and heat resistant targets (V. Capirossi, DISAT, INFN, Italy)  
10:10-10:30 Analysis of thin Tb/Pd intermetallic targets prepared by the coupled reduction reaction (N. Cerboni, PSI, Switzerland)  
10:30-11:00 Coffee break  
11:00-11:20 Preparation and characterization of Pu-239 and Pu-240 recoil ion sources providing U-235m and U-236 for laser-spectroscopic study (L. E. Reed, U. Mainz, Germany)  
11:20-11:40 Estimation of the thickness distribution of the evaporated material based on Lambert's Law (A. Stolarz, University of Warsaw, Poland)

#### Session: Gas targets (chair: N. Kheswa)

- 11:40-12:00 Cluster size determination of a cluster-jet target using shadowgraphy measurements (H. Eick, WWU Münster, Germany)  
12:00-12:20 The MAGIX jet target – A windowless target for high precision experiments at an energy-recovery linac (P. Brand, WWU Münster, Germany)  
12:20-14:00 Lunch  
14:00-14:20 The Münster Cluster-Jet-Target for the future PANDA Experiment (S. Vestrick, WWU, Münster, Germany)  
14:20-14:40 A novel technique for the production of robust actinide targets using solution combustion Synthesis (SCS) and electrospraying techniques (S. Dede, Texas A&M Univ., Univ. of Notre Dame, USA)

#### Session: Method development (chair: R. Dressler)

- 14:40-15:00 Development of a modular Hivipp system (C. Mohs, ANL, Argonne, USA)  
15:00-15:20 The influence of water and carbon dioxide content in solvents on lanthanide thin films produced by molecular plating (E. Artes, JGU Mainz, HI Mainz, Germany)  
15:20-15:40 Exhibition introduction and visit (D. Schumann)  
15:40-16:10 Coffee break  
16:10-16:30 Spherical powders: Control over the size and morphology of powders for additive manufacturing and enriched stable isotope nuclear targets (M. Zach, Oak Ridge National Laboratory, USA)  
16:30-16:50 Development of a low-loss, minimal exposure technique for thallium foil fabrication (J. Conner, Oak Ridge National Laboratory, USA)

16:50-17:10 Novel actinide target making method: Spin-coating assisted combustion synthesis (A. Majumdar, Univ. of Notre Dame, USA)

## Tuesday, 27.09.2022

### Session: Actinide targets (chair: C. Stodel)

9:00-9:30 Targets for radioisotope production, neutron scattering, nuclear data measurements, and exploring the limits of the periodic table (**invited** K. Myhre, ORNL, USA)

9:30-9:50 Actinide and lanthanide target developments using a drop-on-demand printing system (D. Renisch, JGU Mainz, HI Mainz, Germany)

9:50-10:10 Production of powder targets for neutron induced cross section measurements (G. Sibbens, European Commission, Joint Research Centre, Belgium)

10:10-10:30 Application of multiple source preparation procedures on environmental samples in alpha spectrometry (M. Abubakar, Ghana Atomic Energy Commission, Ghana)

10:30-11:00 **Coffee break**

### Session: Stripper foils (chair: D. Kiselev)

11:00-11:20 Method for releasing the carbon foil from the substrate (**online** H. Hasebe, Nishina Center for Accelerator-Based Science, Japan)

11:20-11:40 Preparation of different carbon stripper foils and application in beam diagnostics (B. Lommel, GSI, Germany)

11:40-12:00 Installation and commissioning of the stripping foil system in the new CERN PS booster 160 MeV h-injection region (W. Weterings, CERN, Switzerland)

12:00-12:20 Overview and status of FRIB charge stripper and charge selector (T. Kanemura, MSU, East Lansing, USA)

12:20 -14:00 **Lunch**

### Session: Stable targets I (chair: A. Stolarz)

14:00-14:20 Improvements in iridium target chemistry (A. Marengo, LANL, USA)

14:20-14:40 Electrodeposition of iridium for target manufacturing (N. Kheswa, NRF-iThemba LABS, South Africa)

14:40-15:00 Design of thin targets for the NUMEN experiment (F. Pinna, DISAT, INFN, Italy)

15:00-15:20 Fabrication and characterization of high purity <sup>93</sup>Nb target on lead backing (A. Pandey, Univ. of Delhi, India)

15:20-15:40 **Conference picture**

15:40-16:10 **Coffee break**

16:10-16:30 Spanning the periodic table: An overview of stable isotope target fabrication at ORNL (C. Forster, Oak Ridge National Laboratory, USA)

16:30-16:50 Preparation and characterization of HOPG-backed targets for the NUMEN project (A. Massara, INFN Catania, Italy)

## Wednesday, 28.09.2022

### Session: High power targets (chair: D. Schumann)

9:00-9:30 High-power targets for the production of radioisotope beams (**invited** A. Gottberg, TRIUMF, Univ. of Victoria, Canada)

9:30-9:50 REPARE: Design of a high-power solid target (M. Michel, GANIL, France)

9:50-10:10 The PSI Meson Target facility and its upgrade IMPACT-HIMB (D. Kiselev, PSI, Switzerland)

10:10-10:30 IMPACT-TATTOOS as part of the infrastructure roadmap Switzerland initiative: Challenges of the design concepts (R. Eichler, PSI & Univ. Bern, Switzerland)

10:30-11:00 Coffee break

11:00-11:20 Design, construction, commissioning, and early operation of the third-generation n\_TOF neutron spallation target at CERN (R. Esposito, CERN, Switzerland)

11:20-11:40 A Spallation target at TRIUMF for fundamental neutron physics (S. Vanbergen TRIUMF Canada)

**Session: Target for beam development (chair: D. Kiselev)**

11:40-12:00 A new cryogenic target at LNL (CTADIR) (M. Sedláč, LNL-INFN, Italy)

12:00-12:20 Ni target development for TULIP project (P. Jardin, GANIL, France)

12:20-13:00 Lunchbox

13:00-19:00 Social Program: Excursion to Lucerne, City tour

19:00-23:00 Conference Dinner: Boat tour on lake "Vierwaldstättersee"

## Thursday, 29.09.2022

**Session: Isotope production (chair: G. Sibbens)**

9:00-9:30 Water as a target for heavy ion irradiations (invited G. Severin, MSU, FRIB, USA)

9:30-9:50 Isotope production at PSI (R. Dressler, PSI, Switzerland)

9:50-10:10 A Missing link: towards the preparation of a  $^{32}\text{Si}$  target for nuclear astrophysics experiments (M. Veicht, EPFL & PSI, Switzerland)

10:10-10:30 Radiolysis in a flowing-water target during isotope harvesting (online K. Domnanich, MSU, FRIB, USA)

10:30-11:00 Coffee break

**Session: Medical application (chair: E. Maugeri)**

11:00-11:20 Production of Pb-203 from target manufacturing to chemical separation Tl/Pb (T. Sounalet, Subatech, France)

11:20-11:40 Target preparation for radionuclide development towards medical application at Paul Scherrer Institut (Z. Talip, PSI, Switzerland)

11:40-12:00 Study of Liquid bismuth as an alternative target for At-211 production (T. Bigourdan, GIP ARRONAX, France)

12:00-12:20 Novel solid target and irradiation methods for theragnostic radioisotope production at the Bern medical cyclotron (G. Dellepiane, Uni Berne, Switzerland)

12:20 -14:00 Lunch

14:00-14:20 On-line temperature measurement in a water-cooled solid-target at the BC1710 cyclotron (I. Spahn, FZ Jülich, Germany)

14:20-14:40 Towards Radium-226 target development for photonuclear cross section measurements (H. Skliarova, Belgian Nuclear Research Centre SCK CEN, Belgium)

14:40-15:00 Targetry for the in-beam activation of tracer particles for positron emission particle tracking (T. W. Leadbeater, Univ. Cape Town, South Africa)



**Session: Education (chair: B. Kindler)**

- 15:00-15:20 1<sup>st</sup> student target workshop at Argonne National Laboratory (M. Gott, ANL, Argonne; USA)
- 15:20-15:40 Cold-rolling a  $^{54}\text{Fe}$  target for nuclear structure studies and student training (M. Gott, ANL, Argonne, USA)
- 15:40-16:10 Coffee break
- 16:10-17:30 INTDS Board Member Election (G. Sibbens)

**Friday, 30.09.2022**

**Session: Stable targets II (chair: B. Lommel)**

- 9:00-9:30 Preparation and characterization of  $^{82}\text{Se}$  targets with trigonal hexagonal crystal structure for ion-beam nuclear structure experiments (invited N. Florea, IFIN-HH, Romania)
- 9:30-9:50 Production of PbSe targets for neutron capture cross section studies (N. Chiera, PSI, Switzerland)
- 9:50-10:10 Comparison of  $\text{Bi}_2\text{O}_3$ -targets produced by thermal evaporation and DC magnetron sputtering (B. Kindler, GSI, Germany)
- 10:10-10:30 The preparation of isotopic boron targets – Searching for a more consistent approach (M. Gott, ANL, Argonne, USA)
- 10:30-11:00 Coffee break
- 11:00 -12:20 Visit PSI accelerator facilities
- 13:00 End of INTDS 2022, departure
- 14:00-16:10 INTDS board member meeting



## Program overview

Sunday, 25.09.2022, 18:00 PSI Restaurant OASE Welcome reception

	<b>Monday, 26<sup>th</sup></b>	<b>Tuesday, 27<sup>th</sup></b>	<b>Wednesday, 28<sup>th</sup></b>	<b>Thursday, 29<sup>th</sup></b>	<b>Friday, 30<sup>th</sup></b>
09:00-09:30	<b>Welcome</b> A. Pautz (Department Head NES) C. Stodel (President INTDS) D. Schumann (conference chair)	<b>Actinide targets</b> Chair: C. Stodel K. Myhre <i>invited</i>	<b>High power</b> Chair: D. Schumann A. Gottberg <i>invited</i>	<b>Isotope production</b> Chair: G. Sibbens G. Severin <i>invited</i>	<b>Stable targets II</b> Chair: B. Lommel N. Florea <i>invited</i>
09:30-09:50	<b>Target characterisation</b> Chair: K. Eberhardt E.A. Maugeri	D. Renisch	M. Michel	R. Dressler	N. Chiera
09:50-10:10	V. Capirossi	G. Sibbens	D. Kiselev	M. Veicht	B. Kindler
10:10-10:30	N. Cerboni	M. Abubakar	R. Eichler	K. Domnanich	M. Gott
10:30-11:00	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
11:00-11:20	L.E. Reed	<b>Stripper foils</b> Chair: Z. Talip H. Hasebe	R. Esposito	<b>Medical application</b> Chair: E.A. Maugeri T. Sounalet	Visit PSI of accelerator facilities Departure: 11:00 outside Auditorium
11:20-11:40	A. Stolarz	B. Lommel	S. Vanbergen	Z. Talip	
11:40-12:00	<b>Gas targets</b> Chair: N. Kheswa H. Eick	W. Weterings	<b>Targets for Beam development</b> Chair: D. Kiselev M. Sedlak	T. Bigourdan	
12:00-12:20	P. Brand	T. Kanemura	P. Jardin	G. Dellepiane	
12:20-14:00	Lunch	Lunch	Lunch box Excursion to Lucerne Boat trip  Conference Dinner  Departure: 13:00 from Bus station PSI West	Lunch	End of conference
14:00-14:20	S. Vestrick	<b>Stable targets I</b> Chair: A. Stolarz A. Marengo		I. Spahn	INTDS board meeting
14:20-14:40	<b>Method development</b> Chair: R. Dressler S. Dede	N. Kheswa		H. Skliarova	
14:40-15:00	C. Mohs	F. Pinna		T. Leadbeater	
15:00-15:20	E. Artes	A. Pandey		<b>Education</b> Chair: B. Kindler M. Gott	
15:20-15:40	<b>Exhibition introduction and visit</b>	Conference picture		M. Gott	
15:40-16:10	Coffee break	Coffee break		Coffee break	
16:10-16:30	M. Zach	C. Foster		INTDS Board Member Election Chair: G. Sibbens	
16:30-16:50	J. Conner	A. Massara			
16:50-17:10	A. Majumdar				