



Trento Institute for
Fundamental Physics
and Applications



4th SUMMER SCHOOL on Neutron Detectors and Related Applications NDRA-2022

30th June – 4th July, 2022.
Riva del Garda, Trento, Italy.



Continuing in its tradition, the aim of the school is to illustrate principles, methodologies and most recent applications of neutron detection technologies. In particular, the school will tackle various arguments that span from neutron interaction principles, materials for neutrons detectors, neutron sources, Monte Carlo simulation codes, up to applications with neutrons.

The school is addressed to PhD students, Post-Docs and young researchers with backgrounds in Engineering and Physics.

TOPICS

- Neutron interaction with materials.
- Physics of neutron detectors.
- Materials for neutron detection.
- Monte Carlo simulation.
- Gas detectors for neutrons.
- Neutron sources.
- Neutrons in medicine, energy and environment.

LECTURERS

Jason Hayward (*S&D Center, FBK, Italy*) - Physics of neutron interaction with materials.

Paul Schotanus (*Scionix, Netherlands*) - Inorganic scintillators for neutron detection.

Peter Schillebeeckx (*EC-JRC-IRMM, Belgium*) - Data analysis in neutron detection

Gregor Kramberger (*Josef Stefan Institute, Ljubljana, Slovenia*) - Solid state neutron detectors.

Richard Hall-Wilton (*European Spallation Source, Lund, Sweden*) - Neutron sources.

Sara Pozzi (*University of Michigan, USA*) - Neutron detection for nonproliferation applications.

Alfredo Ferrari (*Karlsruher Institut für Technologie, Germany*) - Monte Carlo methods.

Ralf Engels (*Forschungszentrum Jülich, Germany*) - Detector design.

Bruno Guerard (*Institute Laue-Langevin, France*) - Gas detectors.

Frederico Garrido (*Université Paris Sud, France*) - Neutrons and nuclear waste materials.

Silva Bortolussi (*University of Pavia, Italy*) - Neutrons for cancer therapy.

Stanislav Pospisil (*Czech Technical University in Prague, Czech Republic*) - Position sensitive semiconductor detectors of neutrons

Petr Burian (*University of West Bohemia in Pilsen, Czech Republic*) - Design of readout systems for pixel detectors.

Benedikt Bergmann (*Czech Technical University in Prague, Czech Republic*)

- Application of the time-of-flight technique for study of neutron interactions on semiconductors.

ORGANIZING COMMITTEE

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FEES

Senior researchers	Before 1 st June 450 €	After 1 st June 500 €
Students	Before 1 st June 350 €	After 1 st June 400 €

A maximum of 60 registrations will be accepted. People who intend to join the school can preliminarily contact the organizing committee.

POSTER AND ORAL PRESENTATIONS

PhD and Post-Doc students are invited to present a poster for a dedicated session.

HOW TO REACH RIVA DEL GARDA



Motorway

A22, Brennero motorway, Rovereto sud exit: 15 minutes from the toll booth.

By coach

Direct links from Trento and Rovereto (Trentino Trasporti buses); from Verona and Desenzano (A.P.T.V. buses); from Brescia and Milan (S.I.A. buses).

By plane

- Verona Airport "Valerio Catullo" (recommended)
- Brescia Airport "Gabriele D'Annunzio"
- Bergamo Airport "Orio al Serio"
- Milano Airports "Malpensa" and "Linate"
- Venezia Airport "Marco Polo"

By train

Nearest station is Rovereto (Brennero line) 20 km from Riva del Garda.

Summer School on Neutron Detectors and Related Applications: NDRA-2022

Riva del Garda 30th – 4th July 2022

DRAFT PROGRAM

Thursday, 30th June

16.00-20.00 Registration and Welcome Reception

Friday, 1st July

8.30-9.30 Registration and Opening

9.30-10.30 Jason Hayward (*University of Tennessee and ORNL, USA*)

Neutron Interaction with Matter: Basics for Neutron Detection.

10.30-11.00 *Coffee Break*

11.00-12.00 Jason Hayward (*University of Tennessee and ORNL, USA*)

Neutron Interaction with Matter: Basics for Neutron Detection.

12.00-13.00 Stanislav Pospisil (*Czech Technical University in Prague, Czech Republic*)

Position sensitive semiconductor detectors of neutrons.

13.00-14.00 *Lunch*

14.00-15.00 Paul Schotanus (*Scionix-Nederlands*)

Organic and inorganic scintillators for Neutron Detection.

15.00-16.00 Paul Schotanus (*Scionix-Nederlands*)

Organic and inorganic scintillators for Neutron Detection.

16.00-16.30 *Coffee Break*

16.30-17.30 Petr Burian (*University of West Bohemia in Pilsen, Czech Republic*)

Design of readout systems for pixel detectors.

Saturday, 2nd July

8.30-9.30 Ralf Engels (*Forschungszentrum Jülich, Germany*)

Design of Scintillator Detectors for neutrons.

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Design of Scintillator Detectors for neutrons.

10.30-11.00 *Coffee Break*

11.00-12.00 Alfredo Ferrari (*Karlsruher Institut für Technologie, Germany*)

Monte Carlo Principles for Neutron Experiments.

12.00-13.00 Alfredo Ferrari (*Karlsruher Institut für Technologie, Germany*)

Monte Carlo Principles for Neutron Experiments.

13.00-14.00 *Lunch*

14.00-15.00 Gregor Kramberger (*Josef Stefan Institute, Ljubljana, Slovenia*)

Principles of Semiconductor Detectors.

15.00-16.00 Gregor Kramberger (*Josef Stefan Institute, Ljubljana, Slovenia*)

Principles of Semiconductor Detectors.

Sunday, 3rd July

8.30-9.30 Bruno Guerard (*Institute Laue-Langevin, France*)

Gas Detectors for Neutrons.

9.30-10.30 Bruno Guerard (*Institute Laue-Langevin, France*)

Gas Detectors for Neutrons.

10.30-11.00 *Coffee Break*

11.00-12.00 Peter Schillebeeckx (*EC-JRC-IRMM, Belgium*)

Design and Analysis in Neutron Resonance Experiments.

12.00-13.00 Peter Schillebeeckx (*EC-JRC-IRMM, Belgium*)

Design and Analysis in Neutron Resonance Experiments.

13.00-14.00 *Lunch*

Sunday afternoon **INDUSTRIAL DAY** – sponsored by ChETEC-INFRA EU project

14.00-15.00 Richard Hall-Wilton (*S&D Center, FBK, Italy*)

Neutron Sources.

15.00-16.00 Richard Hall-Wilton (*S&D Center, FBK, Italy*)

Detectors for Spallation Sources.

16.00-17.00 *Coffee Break + Poster session*

17.00-18.30 Industrial presentations

A. Caciolli (*University of Padova, Italy*)

The CHETEC-INFRA project.

P. Schotanus (*Scionix-Netherlands*)

Relation of public research with industrial partners.

Yuri Venturini (*CAEN, Italy*)

New digital acquisition solutions for neutron detectors and applications.

20.00 **Informal Discussion with Industrial Partners**

Monday, 4th July

8.30-9.30 Fr derico Garrido (*Universit  Paris Sud, France*)

Neutrons from nuclear waste materials.

9.30-10.30 Silva Bortolussi (*University of Pavia, Italy*)

Neutrons for cancer therapy.

10.30-11.00 *Coffee Break*

11.00-12.00	Sara Pozzi (<i>University of Michigan - US</i>) <u>Neutron Detection for Nonproliferation Applications.</u>
12.00-13.00	Benedikt Bergmann (<i>Czech Technical University in Prague, Czech Republic</i>) <u>Application of the Time-of-Flight technique for study of neutron interactions on semiconductors.</u>
13:00	Closing
<i>13.00-14.00</i>	<i>Lunch</i>