

# Channeling 2023: *Advance Program*

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*Sunday, 4 June*

16:00-18:00 - **Registration at the Hotel Corallo**

**"CHANNELING PRIMER"**  
**Hotel Corallo**

17:00 - **S. Dabagov**

- Opening

17:10 - **Prof. F.V. Costa**, Riccione, La Perla Verde dell'Adriatico: una Storia per Immagini  
(*Invited*)

17:35 - **Dr. G. Mazzitelli** Open Issues in Astroparticle Experimental Physics (*Invited*)

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18:00-19:30 - **Welcome at the Hotel Corallo**

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*Monday, 5 June - Hotel Corallo*

**S1: Beams Interactions**

**Session 1.1**      **Chair: S. Dabagov**

9:00-9:30 **S. Dabagov**

Advanced Channeling Technologies to Guide Charged and Neutral Beams (*Invited*)

9:30-9:50 **A. Mazzolari**

Future proof-of-principle experiment on crystal-based extraction of electrons from the DESY II Booster Synchrotron

9:50-10:10 **V. Haurylavets**

The basic model of crystalline medium simulation in GEANT4

10:10-10:30 **A. Sytov**

First ab-initio channeling and Baier-Katkov Geant4 FastSim model

10:30-10:50 **Ph. Schoofs**

Recent developments of the FLUKA Channeling model and benchmarking of SPS and LHC crystal-related activities

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**Coffee break (20 min)**

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**S2: Radiation: Generation & Interaction**  
**Session 2.1      Chair: H. Backe**

- 11:10-11:40 **A. Solov'yov**  
Horizon Europe EIC-Pathfinder Project TECHNO-CLS: "Emerging technologies for crystal-based gamma-ray light sources" (*Invited*)
- 11:40-12:00 **R. Negrello**  
Study of the influence of the curvature radius and the beam energy on beam steering and radiation by sub-GeV electrons
- 12:00-12:20 **S. Strokov / A. Shchagin**  
About frequencies of radiation of relativistic particles in periodical crystalline structure
- 12:20-12:40 **P. Monti-Guarnieri**  
Experimental studies towards the development of an ultra-compact electromagnetic calorimeter composed of oriented crystals
- 12:40-13:00 **V. Dyubkov**  
Beam dynamics in the storage ring of a compact monochromatic radiation source in the X-ray range based on Compton backscattering

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**Lunch break (3 h)**

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**S4: *New Concepts***

**Session 4.1      Chair: L. Bandiera**

- 16:00-16:30 **L. Serafini**  
Symmetric Compton Scattering - a Possible Way to Compact Monochromatic Gamma-Ray Sources (*Invited*)
- 16:30-16:50 **G. Cavoto / F.M. Pofi**  
Searching for dark matter with vertically-aligned carbon nanotubes: the ANDROMEaDa project
- 16:50-17:10 **A. Mkrtchyan**  
Emission on prohibited transitions in acoustoplasma environment
- 17:10-17:30 **A. Shchagin**  
Ionization loss for measurements of the dechanneling length of electrons
- 17:30-17:50 **D. Gavrilenko**  
Anti-shielding of the Coulomb field of relativistic charge in a matter

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**Coffee break (20 min)**

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**PS: *Poster Session***

**Session PS1**

**Chair: D. Hampai**

- PS1-01 Excitation of a giant dipole resonance by radiation of channeled electrons in a Si (110) crystal *by Ashurko et al*
- PS1-02 Spin dynamics in nonuniform electromagnetic wave fields *by Dik et al*
- PS1-03 On charged particle dynamics near flat solid surface *by Dik et al*
- PS1-04 Coherent channeling radiation of electron beam in optical lattice *by Dik et al*
- PS1-05 Impact of dopant concentration on the crystalline structure of Si-Ge crystals for the construction of crystal-based light sources using molecular dynamics simulations *by Dickers et al*
- PS1-06 Crab crossing in inverse Compton scattering of diverging beams *by Gavrilenko et al*
- PS1-07 Use of focusing crystals in magnetic fields *by Maishev et al*
- PS1-08 Formation of hydrogen atom beams during capture of electrons by non-relativistic protons channeled in carbon nanotubes *by Maksyuta et al*
- PS1-09 Ion irradiated aligned multiwall carbon nanotubes physical properties *by Stepanov et al*
- PS1-10 Orbital angular momentum of axial channeling radiation from relativistic electrons in thin Si crystal *by Bogdanov et al*
- PS1-11 Study of spontaneous radiation during axial channeling of relativistic positrons in hexagonal crystals *by Maksyuta et al*

*Tuesday, 6 June - Hotel Corallo*

**S1 & S3: Beams Interactions & Acceleration Techniques**

**Session 1.2 & 3.1      Chair: V. Guidi**

9:00-9:30 **S. Taskaev**

Accelerator based Neutron Source VITA (*Invited*)

9:30-9:50 **A. Sytov**

Status and prospects of E336 Experiment at SLAC FACET-II on channeling plasma wakefield acceleration in structured solids

9:50-10:10 **V. Maisheev**

Reduction of multiple scattering of positively charged ultrarelativistic particles channeling in planar fields of single crystals

10:10-10:30 **M. D'Andrea**

Operational experience, recent developments and plans for crystal collimation at the LHC

10:30-10:50 **E-D. Bosne**

Electron Emission Channeling for lattice location of radioactive isotopes in single crystals: Improvements from a Timepix3 quad detector and new PyFDD data analysis software

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**Coffee break (20 min)**

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**S2: Radiation: Generation & Interaction**  
**Session 2.2      Chair: G. Mazzitelli**

11:10-11:40 **R. Chehab**

From Bremsstrahlung to Channeling Radiation. A Promising Way for Positron Generation (*Invited*)

11:40-12:00 **R. Chehab**

Advances of hybrid positron sources with granular converters

12:00-12:20 **P. Karataev**

Experimental demonstration of super-radiant emission of coherent Cherenkov Diffraction Radiation

12:20-12:40 **V. Kotanjyan**

Radiation of surface polaritons in cylindrical channels

12:40-13:00 **A. Shchagin**

Pyroelectric electron beam deflector and undulator

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**Lunch break (3 h)**

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**S2 & S4: Radiation: Generation & Interaction. & New Concepts**  
**Session 2.3 & 4.2      Chair: L. Serafini**

- 16:00-16:30 **G. Dattoli**  
Some Considerations on the Development of 'new' FEL Architecture (*Invited*)
- 16:30-16:50 **V. Dyubkov**  
New solutions for acceleration and radiation in a new Compton source at MEPHI
- 16:50-17:10 **V. Vysotskii**  
Generation of microwave self-channeling undamped temperature waves and their use for stimulation of nuclear fusion in remote and behind-screen targets
- 17:10-17:30 **L. Grigoryan**  
Observation of coherent Cherenkov Radiation of electron bunches from a partially dielectric loaded waveguide
- 17:30-17:50 **A. Sargsyan**  
Spectral-angular distribution of radiation generated by train of electron bunches passing through the centre of a ball
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**PS: Poster Session**

**Session PS2      Chair: L. Marchitto**

- PS2-01 Electron beam modulation by 3D printed plastic samples *by Stuchebrov et al*
- PS2-02 Concept of a new method for determining the transverse profile of wide-aperture beams *by Bulavskaya et al*
- PS2-03 Peculiarities of Cherenkov Radiation by a train of bunches moving inside a partially dielectric loaded waveguide *by Khachatryan et al*
- PS2-04 The phenomenon of monoenergetic electron generation in the pyroelectric accelerator *by Oleinik et al*
- PS2-05 Ion accelerations in a liquid medium *by Yeghizaryan et al*
- PS2-06 Desktop devices for alignment of X-ray double interferometer and generation of dislocations in its block-crystal *by Mkhitarian et al*
- PS2-07 Optical properties of corundum crystals after electron beam exposure *by Cherepennikov et al*
- PS2-08 Estimation of radiation exposure of human body in neutron-capture radiation therapy *by Cherepennikov et al*
- PS2-09 Particle-in-Cell modeling of coherent Inverse Compton Scattering *by Piot et al*
- PS2-10 The synchronous detection technique for accurate monitoring of high-energy pulsed X-rays *by Salvatori et al*
- PS2-11 Commissioning the STAR Inverse Thomson Scattering X-ray source: progress report *by Ruijter et al*

*Wednesday,  
7 June - Hotel Corallo*

**S1 & S3: Beams Interactions & Acceleration Techniques**  
**Session 1.3 & 3.3      Chair: Ph. Piot**

- 9:00-9:30 **L. Bandiera**  
Radiation and Pair Production in Oriented Crystals: Innovative Application to Future Particle Accelerators and Detectors (*Invited*)
- 9:30-9:50 **S. Mkhitarian**  
On the possibility of accelerating charged particles in the atmosphere
- 9:50-10:10 **H. Backe**  
A 500 MeV positron beam for channeling experiments at the Mainz Microtron MAMI
- 10:10-10:30 **W. Lauth**  
On (110) planar channeling experiments with 500 MeV positrons in silicon single crystals
- 10:30-10:50 **A. Stepanov**  
Channeling of low-energy ions in carbon nanotubes taking into account many-body effects

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**Sightseeing Tour to Urbino**

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*Thursday, 8 June - Hotel Corallo*

**S5: Applications & X-Rays**

**Session 5.1 & 3.1      Chair: L. Marchitto**

9:00-9:30 **D. Giulietti**

X-Rays from Laser Produced Plasmas (*Invited*)

9:30-9:50 **V. Vysotskii**

Efficient space-selective and space-scanning nuclear fusion based on channeling low-energy particles in crystals

9:50-10:10 **V. Vysotskii**

Application of short-distance adaptive channeling of low energy particles in above-target graphene to optimize nuclear fusion in unstructured target

10:10-10:30 **L. Aloyan**

Investigation of Ultrashort Electron Beam Interaction with the DNA Molecule

10:30-10:50 **R-P. Yadav**

Vertically-aligned carbon nanotubes as effective platforms to kill bacteria

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**Coffee break (20 min)**

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**S3 & S4: Acceleration Techniques & New Concepts**  
**Session 3.3 & 4.3      Chair: D. Hampai**

- 11:10-11:40 **S. Pettinato**  
Diamond-Based Detection Systems for Tomorrow's Precision Dosimetry
- 11:40-12:00 **M. Galimberti**  
The major upgrade projects EPAC and Vulcan 20-20
- 12:00-12:20 **M. Cosic**  
The structure of quantum carpets in a carbon nanotube
- 12:20-12:40 **Majid Ali**  
Stability of electrons and X-rays generated in a pyroelectric accelerator
- 12:40-13:00 **V. Zvorykin**  
Capillary channel formation in PMMA and electrons acceleration by a long-pulse KrF laser

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**Lunch break (3 h)**

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**S5: Applications & X-Rays**

**Session 5.2**      **Chair: A. Mkrtchyan**

16:00-16:30 **A. Scordo**

Present Status and Future Perspectives of High Precision X-Ray Measurements at LNF for Nuclear Physics and Agrifood Applications (*Invited*)

16:30-16:50 **V. Kocharyan**

Diffraction image of  $\mathbb{D}^\circ$  narrow X-rays beam in crystals with weak deformation

16:50-17:10 **P. Plescia**

A new way to develop "LOW COST" instrumentation: the PICO RX diffractometer/XRF spectrometer enhanced with polycapillary lenses

17:10-17:30 **L. Marchitto**

X-ray based techniques for transportation applications

17:30-17:50 **D. Hampai**

X-ray channeling for imaging and spectroscopic applications at XLab Frascati

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20:00 **Social Dinner - Restaurant at Hotel Corallo**

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*Friday, 9 June - Hotel Corallo*

**S1 & S4: Beams Interactions & New Concepts**

**Session 1.4 & 4.4      Chair: P. Karataev**

9:00-9:30 **Ph. Piot**

Considerations toward a Compact Coherent Light Source based on a Two-Beam Acceleration Technique (*Invited*)

9:30-9:50 **M. Iliescu**

SPHINX: Structure probing by holographic imaging at nanometer scale with X-ray lasers

9:50-10:10 **N. Kalashnikov**

Adiabatic invariants at channeling in a curved crystal

10:10-10:30 **R. Cai**

Simulations of crystal collimation processes for 6.8 Z TeV lead ion beams at the LHC

10:30-10:50 **V. Nagaslaev**

Feasibility of using the crystal channeling to reduce the beam losses in Slow Extraction at 8 GeV

10:50-11:10 **M. Garattini**

Bent crystal extraction from DAΦNE storage rings: the SHERPA experiment

11:10-11:30 **T. Tukhfatullin**

Half-wavelength-crystal channeling of relativistic ions and its possible application for beam deflection and focusing

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**Channeling 2023: Closing**

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