

Applied Nuclear Physics Conference 2021

September 12–16
Prague, Czech Republic

www.anpc2021.cz

Monday 13/9/2021

JANÁK HALL ● PLENARY SESSION ● Session chair: Anna Macková	
8:40 – 8:50	Opening Anna Macková
8:50 – 9:30	Plenary talk Applied nuclear physics at new particle accelerators Marco Durante
9:30 – 9:40	2020 IBA - Europhysics Prize - Iva Bogdanovic Radovic
9:40 – 10:10	Invited talk Ion-beam therapy at hit: options for multi-ion treatment and research Thomas Haberer, IBA winner 2020
10:10 – 10:40	Invited talk Novel developments of ion-beam tools for non-destructive composition analysis Daniel Primetzhofer

JANÁK HALL ● PARALLEL SESSIONS		HALL NO. 152+153 ● PARALLEL SESSIONS	
NUCLEAR PHYSICS IN MEDICINE ● Session chair: Katia Parodi		ION BEAM ANALYTICAL METHODS IN MATERIAL SCIENCE ● Session chair: Katharina Lorenz	
11:00 – 11:30	Invited talk Hadrontherapy: physics meets oncology in the fight against cancer Sandro Rossi - ON-LINE	11:00 – 11:30	Invited talk MeV SIMS applications in material science Zdravko Siketic
11:30 – 11:50	Nuclear fragmentation studies for hadron therapy and space radiation protection with the foot experiment Sofia Colombi - ON-LINE	11:30 – 12:00	Invited talk Ion beams and synchrotron light in perspective Gaston Garcia Lopez - ON-LINE
11:50 – 12:10	Simultaneous neutron and gamma imaging system for real time range and dose monitoring in hadron therapy and other applications Jorge Leredegui-Marco	12:00 – 12:20	Boron quantification and depth profiling by ion beam analysis for characterization of novel boride materials Eduardo Pittman - ON-LINE
12:10 – 12:30	Microdosimetry measurements of low energy protons with new silicon 3D-microdetectors Consuelo Guardiola - ON-LINE	12:20 – 12:40	Trajectory-dependent electronic excitations of keV ions Svenja Lohmann

NUCLEAR PHYSICS IN MEDICINE ● Session chair: Marie Davidková		ION BEAM ANALYTICAL METHODS IN MATERIAL SCIENCE ● Session chair: Iva Bogdanovic Radovic	
13:40 – 14:10	Invited talk Novel radioisotopes for medical applications: the CERN MEDICIS project and beyond Thomas Cocolios	13:40 – 14:10	Invited talk Elemental mapping on the nm scale: secondary ion mass spectrometry in the helium ion microscope Rene Heller - ON-LINE
14:10 – 14:30	Improvement of nuclear reaction modeling for the production of ⁴⁵Sc on natural vanadium targets for medical applications Alessandro Colombi - ON-LINE	14:10 – 14:30	Novel applications of 3D ion transmission experiments at keV energies Radek Holeňák
14:30 – 14:50	Theoretical study of ⁴⁵Sc production for theranostic applications using proton beams on enriched titanium targets Francesca Barbaro - ON-LINE	14:30 – 14:50	Spatial and time characterization of Tandetron micro-beams with Timepix and Timepix3 pixel detectors Carlos Granja
14:50 – 15:10	²²⁵Ac: from target to test tube to tumor. Developments on how much ²²⁵Ac can be obtained by the ISOL technique. Jake Johnson	14:50 – 15:10	Enhanced thin film analysis via HRRBS using the NEC CARBS system Thomas Pollock - ON-LINE

NUCLEAR PHYSICS IN MEDICINE ● Session chair: Iva Ambrožová		ION BEAM ANALYTICAL METHODS IN MATERIAL SCIENCE ● Session chair: Daniel Primetzhofer	
15:30 – 16:00	Invited talk Nuclear physics for reduction of range uncertainties in clinical and preclinical applications of ion beams Katia Parodi - ON-LINE	15:30 – 16:00	Invited talk Ion beam modification for Si Lyudmila Goncharova - ON-LINE
16:00 – 16:20	First in situ 2D-microdosimetry maps at a proton therapy center with novel silicon 3D-microdetectors Diana Bachiller-Perea	16:00 – 16:30	Invited talk IBIC microscopy for semiconductor detectors research Maria del Carmen Jiménez Ramos - ON-LINE
16:20 – 16:40	Measurement of the fragmentation cross-section of oxygen ions on carbon and polyethylene targets with the emulsion spectrometer Maria Cristina Montesi - ON-LINE	16:30 – 16:50	Demands and challenges for stopping power tabulations Peter Bauer
16:40 – 17:00	Study of the internal pair production decay of the 0+ excited state in ⁹⁰Zr by magnetic spectrometry Giuseppe Lorusso	16:50 – 17:10	Proton radiography using the Timepix3 pixel detector applied at Tandetron Václav Olšanský
17:00 – 17:20	Auger electron spectroscopy studies at the national physical laboratory for medical applications Hibaaq Mohamad - ON-LINE		

Tuesday 14/9/2021

JANÁK HALL ● PLENARY SESSION ● Session chair: Jan Kučera	
9:00 – 9:40	Plenary talk Recent achievements – and challenges – in ion beam analysis for materials characterization André Vantomme - ON-LINE
9:40 – 10:20	Plenary talk Paradigm shifting of microdosimetry in particle therapy Chiara Latessa
10:20 – 10:50	Invited talk Let spectrometry in radiotherapy and radiation protection Marie Davidková

JANÁK HALL ● PARALLEL SESSIONS		HALL NO. 152+153 ● PARALLEL SESSIONS	
NUCLEAR PHYSICS IN MEDICINE ● Session chair: Thomas Haberer		ION AND NEUTRON BEAM IRRADIATION OF MATERIALS ● Session chair: Zdravko Siketic	
11:10 – 11:30	MONDO: A scintillating fibre tracker for secondary neutron measurements in particle therapy Antonio Trigilio	11:10 – 11:40	Invited talk Highly charged ion interaction with surfaces Richard A. Wilhelm - ON-LINE
11:30 – 11:50	Development of integration mode proton imaging with a single CMOS detector for a small animal irradiation platform Katrin Schnürle - ON-LINE	11:40 – 12:10	Invited talk Nuclear materials and ion irradiation studies using the JANNuS-Orsay in situ dual ion beam transmission electron microscope Aurélie Gentils - ON-LINE
11:50 – 12:10	The PAir PROduction Imaging Chamber (PAPRICA) Yunsheng Dong	12:10 – 12:30	Radiation defect dynamics in beta Ga₂O₃ ion flux vs irradiation Alexander Azarov
12:10 – 12:30	A new nuclear reaction route to produce 52g Mn with high purity for multi-modal imaging Mario Pietro Carante - ON-LINE	12:30 – 12:50	One-step 3D microstructuring of PMMA using MeV light ions Oleksandr Romanenko
12:30 – 12:50	Testing a pCT scanner prototype José Antonio Briz Monago - ON-LINE		

NUCLEAR PHYSICS IN MEDICINE ● Session chair: Sandro Rossi		ION AND NEUTRON BEAM IRRADIATION OF MATERIALS ● Session chair: Alexander Azarov	
13:50 – 14:20	Invited talk Recent trends in development of pet radiopharmaceuticals for nuclear medicine Pavol Rajec	13:50 – 14:10	Recent calculations for D₂O moderated ²⁵²Cf reference fields at PTB Amer Al-Qaod
14:20 – 14:40	Metrology for advanced radiotherapy using particle beams with ultra-high pulse dose: test in flash-like electron beam at microtron MT 25 Iva Ambrožová	14:10 – 14:30	Response of defective KTaO₃ to ionizing ion irradiation Gihan Veliša
14:40 – 15:00	First in-beam tests on simultaneous PET and Compton imaging aimed at quasi-real-time range verification in hadron therapy Javier Balibrea Correa	14:30 – 15:00	Invited talk Unique High Energy Neutron Beams at iThemba LABS Peane Maleka - ON-LINE
15:00 – 15:20	Measurement of the production cross section of β+ emitters for range verification in proton therapy Maria Teresa Rodríguez González	15:00 – 15:20	A ground-based evaluation of the impact of neutron dose rate on health effects during space travel Charlot Vandervoerde - ON-LINE

NUCLEAR PHYSICS IN MEDICINE ● Session chair: Thomas Cocolios		PARALLEL SPECIAL SESSION ● ITHEMBA LAB ● Session chair: Pavol Noga	
15:40 – 16:00	Data-driven model of carbon ion fragmentation in a fast MC code (FRED) for treatment planning system Micol De Simoni	15:40 – 16:10	Invited talk Development and application of the first AMS facility in Africa Stephan Woodborne - ON-LINE
16:00 – 16:20	New methods for theranostic radioisotope production with solid targets at the Bern medical cyclotron Gaia Dellepiane	16:10 – 16:30	Experimental ion beam - matter interaction parameters at 0.1 MeV/u - 1.0 MeV/u energies for heavy ion nuclear analytical techniques Mandla Msimanga - ON-LINE
16:20 – 16:40	Clinical results of in-vivo inter-fractional monitoring in particle therapy by means of the inside in-beam PET Elisa Fiorina - ON-LINE	16:30 – 16:50	Micro proton induced x-ray emission spectroscopy application in environmental studies Christopher Mtshali - ON-LINE
16:40 – 17:00	Inter-fractional monitoring in Particle Therapy treatments with 12C ions exploiting the detection of secondary particles Gaia Franciosini		
17:10 – 17:30	RAPID FIRE POSTER SESSION (ON-LINE)	17:30 – 17:45	Exhibition companies on line - iThemba lab
		17:45 – 18:00	Exhibition companies on line - NEC
18:00 – 20:00	Exhibition companies and infrastructure/Poster session 1 - Nuclear Physics in Medicine, Ion and Neutron Beam Irradiation of Materials and iThemba lab posters - FOYER		

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EXHIBITORS & SPONSORS



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Wednesday 15/9/2021

JANÁK HALL ● PLENARY SESSION ● Session chair: Andre Vantomme	
9:00 – 9:40	Plenary talk Ion implantation and radiation effects in group-III nitride semiconductors Katharina Lorenz
9:40 – 10:10	Invited talk Silicon quantum technologies with implanted donors Juha Muhonen – ON-LINE
10:10 – 10:40	Invited talk Semiconductor materials for radiation detection – current status and and future development Alan Owens – ON-LINE
10:40 – 11:00	Coffee break ☕
JANÁK HALL ● PARALLEL SESSIONS	
NUCLEAR PHYSICS FOR CULTURAL HERITAGE AND ENVIRONMENT ● Session chair: Rene Heller	HALL NO. 152-153 ● PARALLEL SESSIONS
11:00 – 11:30	Invited talk Recent achievements in NAA, PAA, IBA, and AMS application for cultural heritage investigations Jan Kučera
11:30 – 11:50	Studying EV ageing effects in modern artist's paints with MeV-SIMS Matea Krmpotic
11:50 – 12:10	Elemental and phase mapping of sword fragments from 2nd-1st century BCE China Anna Fedrigo – ON-LINE
12:10 – 12:30	Recent developments in IBA analysis at CENTA, Bratislava Miroslav Ješkovský – ON-LINE
12:30 – 12:50	Development of a photoionisation mass spectrometer for measurement of ⁸⁶Kr Holly Perrett – ON-LINE MOVED TO THURSDAY (15:10)
12:50 – 13:40	Lunch 🍴
NUCLEAR PHYSICS FOR CULTURAL HERITAGE AND ENVIRONMENT ● Session chair: Federico Piccolo	NUCLEAR PHYSICS FOR ENERGY AND SPACE TECHNOLOGIES ● Session Chair: Marek Rubel
13:40 – 14:00	Natural radioactivity and importance for soil: a review on critical findings in Turkey Inci Karakas – ON-LINE
14:00 – 14:20	Non-destructive mass spectrometry of single hot particles from the Chernobyl exclusion zone by resonant laser SNMS Darcy van Eerten
14:20 – 14:40	Radiation exposure of microorganisms living in radioactive mineral spring Sofia KOLOVI – ON-LINE
14:40 – 15:00	Development of novel instrumentation for matrix independent ultra-trace detection and quantitation of radionuclides using colinear resonance ionisation spectroscopy Giles Edwards
15:00 – 15:30	Coffee break ☕
15:30 – 16:10	Rapid fire poster session (online)
16:10 – 17:00	Exhibition companies and infrastructure/Poster session 2 – Ion Beam Analytical Methods in Material Science, Nuclear Physics for Energy and Space Technologies and Nuclear Physics for Cultural Heritage and Environment
17:00 – 19:00	SIGHTSEEING TOUR OF PRAGUE (WALKING GUIDED TOUR)
19:00	CONFERENCE DINNER

Thursday 16/9/2021

JANÁK HALL ● PLENARY SESSION ● Session chair: Raquel Gonzales Arrabal	
9:00 – 9:40	Plenary talk Small accelerators for cultural heritage - analytical capabilities and historical overview Mariaelena Fedi – ON-LINE
9:40 – 10:10	Invited talk IBA and AMS techniques for Cultural Heritage studies: evidencing ancient and recent forgeries Lucile Beck – ON-LINE
10:10 – 10:40	Invited talk Nuclear physics for the environment and cultural heritage: the LABEC experience Massimo Chiari
10:40 – 11:00	Coffee break ☕
JANÁK HALL	
11:00 – 11:30	Invited talk Ion beam analysis in studies of first wall materials in controlled fusion devices Marek Rubel
11:30 – 11:50	Calibration challenges of pin diode silicon detector Martin Kákona
11:50 – 12:10	Performances of a compact neutron detector using high purity ¹⁰B-enriched PLD-growth films Simone Amaducci – ON-LINE
12:10 – 12:30	Real time dosimetry with radio-chromic films Francesco Di Capua
12:30 – 13:40	Lunch 🍴
JANÁK HALL	
13:40 – 14:10	Invited talk Plasma facing materials for inertial confinement nuclear fusion reactors Raquel González Arrabal – ON-LINE
14:10 – 14:30	Elemental analysis of concrete via fast neutron transmission and scattering spectrometry Tanya Hulston – ON-LINE
14:30 – 14:50	Experimental study of space radiation shielding materials: measurement of secondary radiation behind thick shielding and assessment of its radiobiological effect Miroslav Zbořil – ON-LINE
14:50 – 15:10	Extension of the BIANCA biophysical model up to Fe-ions and applications for space radiation research Ricardo Luis Ramos – ON-LINE
15:10 – 15:30	Development of a photoionisation mass spectrometer for measurement of ⁸⁶Kr Holly Perrett – ON-LINE
15:30 – 15:45	CLOSING

Tuesday 14/9/2021 ● POSTER SESSION

ON-SITE POSTERS		RAPID FIRE POSTER SESSION – ON-LINE	
NUCLEAR PHYSICS IN MEDICINE, ION AND NEUTRON BEAM IRRADIATION OF MATERIALS		NUCLEAR PHYSICS IN MEDICINE, ION AND NEUTRON BEAM IRRADIATION OF MATERIALS	
P1	An optimized DT-neutron generator irradiation facility for prompt neutron activation analysis of light elements ● Radim Uhlář	17:10 – 17:15	eP1 Investigating a potential health risk due to radiation from samples collected in Chad ● Mistura Bolaji Ajani
P2	Energetics, migration and trapping of Zn interstitials in ion implanted ZnO ● Alexander Azarov	17:15 – 17:20	eP2 Photoluminescence and EPR studies of single diamonds with GeV-color centers formed by ion implantation ● Nikolay Lyadov
P3	Study of the charge collection efficiency in novel silicon 3D-detectors for microdosimetry ● Diana Bachiller-Perea	17:20 – 17:25	eP3 Optical parameters study of amorphous germanium (α-Ge) by spectral ellipsometry ● Nikolay Lyadov
P4	Stopping force of diamond like carbon and silicon nitride for beryllium and boron ions ● Basil Gonsalves	17:25 – 17:30	eP4 High-Z metal (oxide) nanoparticles for contrast enhancement in proton imaging at a small animal irradiation platform ● Katrin Schnürle
P5	Ion track formation in sapphire studied by sequential swift heavy ion irradiation ● Juraj Hanžek		
P6	ZnO nano-pillars decorated with Au nanoparticles prepared by ion beam implantation ● Anna Mackova		
P7	Properties of graphene oxide, polyimide, polyetheretherketone and polyethyleneterephthalate implanted by multi-energetic Au ions ● Petr Malinsky		
P8	The structural and optical response of the Au nanoparticles embedded in YSZ modified using high energetic ion irradiation ● Romana Mikšová		
P9	Plasma immersion ion implantation induced surface patterning ● Pavol Noga		
P10	Ion beam synthesis of high oxidation state palladium oxide nanoparticles ● Filip Ferencík		
P11	Assessing electronic excitations in singlecrystalline SiC foils by keV ions ● Eleni Ntemou		
P12	Capabilities of the ion beam microprobe in the study of different polarization quenching techniques applied to SC-CVD detectors ● Mauricio Rodriguez Ramos		
P13	In-situ ToF-LEIS study of tungsten surface enrichment in EUROFER97 by annealing to elevated temperatures ● Jila Shams-Latifi		
P14	Properties of polyamide 6 and polyvinylidene fluoride nanofibers irradiated using C and H ions ● Eva Stepanovska		
P15	Irradiation of (III)-CaF₂ using a modernized beamline in Uppsala ● Petter Ström		
P16	Charge state dependence of the damage onset depth in selfirradiated Ge ● Petter Ström		
P17	Experimental alpha-particle modifications of the natural resins. ● Vladimír Strunga		
P18	Raman spectroscopy investigation and molecular dynamics simulations of ion tracks in graphene ● Kristina Tomić Luketić		
P19	Energy retention in swift heavy ion irradiated thin films ● Damjan Iveković		
P20	Enhancing gamma production for online dose verification in proton therapy ● Giorgio Cartechini		

Wednesday 15/9/2021 ● POSTER SESSION

ON-SITE POSTERS		RAPID FIRE POSTER SESSION – ON-LINE	
NUCLEAR PHYSICS IN ENVIRONMENT AND CULTURAL HERITAGE, NUCLEAR PHYSICS FOR ENERGY AND SPACE TECHNOLOGIES, IBA IN MATERIAL SCIENCE		NUCLEAR PHYSICS IN ENVIRONMENT AND CULTURAL HERITAGE, NUCLEAR PHYSICS FOR ENERGY AND SPACE TECHNOLOGIES, IBA IN MATERIAL SCIENCE	
P21	Development of diamond based cryogenic neutron detectors for nuclear fusion applications ● Donny Cosic	15:30 – 15:35	eP5 X-ray spectroscopy study on Thai amulet: Phra Kru Nadune ● Pisutti Dararutana
P22	Pulsed laser deposition of thin films on polydimethylsiloxane for biomedical application ● Mariapompea Cutroneo	15:35 – 15:40	eP6 Precise determination of U²³⁵ and Ra²²⁶ photopeak intensities in naturally occurring radioactive materials using optimization ● Sy Minh Tuan Hoang
P24	The synthesis of Au-NPs by energetic ion implantation into the crystalline GaN and characterisation of their optical properties ● Adela Jagerová	15:40 – 15:45	eP7 Application of the Rutherford backscattering method in powder nanotechnology ● Alisa Tatarinova
P25	Hydrogen storage on the nanoscale: visualizing interstitial hydrogen in nanostructured metals with MeV ion beams ● Kristina Komander	15:45 – 15:50	eP8 High solid angle RBS detection of heavy elements with low concentrations in silicon ● Fares Boussahoul
P26	Non-destructive techniques applied to the characterization of ancient glass mosaic tesserae ● Giulia Marucci MOVED TO ePoster eP13	15:50 – 15:55	eP9 Studying oxygen mobility in photochromic yttrium oxy-hydrate films by isotopic labelling ● Dmitrii Moldarev
P27	In-situ characterization of ultra-thin nickel silicide films using low energy ion scattering ● Philipp Mika Wolf	15:55 – 16:00	eP10 Development of a compact X-ray multi-technique device for cultural heritage applications ● Leandro Sottili
P28	Characterization of titanium aluminum nitride films using low energy ion scattering ● Philipp Mika Wolf	16:00 – 16:05	eP11 Gamma ray transmission technique with a barium source for the study of copper-based archaeological objects ● Francisco J. Ager
P29	Porous polydimethylsiloxane composite filled with graphene oxide and gold nanoparticles ● Mariapompea Cutroneo	16:05 – 16:10	eP12 Identification of ⁸⁶Sr in environmental samples via the hyphenation of ICP-MS with colinear resonance ionisation spectroscopy ● Matthew Duggan
		16:10 – 16:15	eP13 Non-destructive techniques applied to the characterization of ancient glass mosaic tesserae ● Giulia Marucci