



РАР²⁰

**INTERNATIONAL CONFERENCE
ON RADIATION APPLICATIONS**

In Physics, Chemistry, Biology, Medical Sciences,
Engineering and Environmental Sciences

2020 | Virtual Conference
www.rap-conference.org

**BOOK OF
ABSTRACTS**

TABLE OF CONTENTS

Click on the title of the abstract to access it

RADIOBIOLOGY

- Simulation of bacterial content kinetics in fish after irradiation** _____ **1**
A. Chernyaev, V. Avdyukhina, U. Bliznyuk, P. Borshchegovskaia, V. Ipatova, A. Bliznyuk
- Survival of tumor cells after proton FLASH therapy** _____ **2**
Sergey Akulinichev, Vladimir Bozhenko, Vladimir Vasiliev, Yuri Gavrilov, Dmitriy Kokontsev, Tatyana Kulinich, Valeriia Martynova, Natalya Pozhenko, Alexander Shishkin, Ivan Yakovlev
- Digital mammography: Objective vs. subjective methods of image evaluation** _____ **3**
Ewa Fabiszewska, Anna Wysocka-Rabin, Katarzyna Pasicz, Magdalena Dobrzyńska, Wilold Skrzynski

RADIATION PHYSICS

- Method of dose modification in foodstuffs during irradiation** _____ **4**
A. Chernyaev, V. Avdyukhina, U. Bliznyuk, P. Borshchegovskaya, A. Belousov, F. Studenikin, V. Ipatova, A. Bliznyuk

RADIATION IN MEDICINE

- Liposomes as the selective transport of the boron-10 into tumor cells for boron neutron capture therapy use** _____ **5**
Alphiya Tsygankova, Aleksandr Kichigin, Evgenii Zavyalov, Tatiana Guselnikova, Roman Sibirtsev, Rinat Mukhamadiyarov, Vladimir Kanygin
- The comparison of the effectiveness of different administration methods of the drug for BNCT** _____ **6**
Vladimir Kanygin, Alphiya Tsygankova, Aleksandr Kichigin, Evgenii Zavyalov, Tatiana Guselnikova, Roman Sibirtsev, Rinat Mukhamadiyarov
- In vitro assessment of gamma irradiation effects on regulatory T cells of lymphocyte culture in lymphoproliferative diseases** _____ **7**
Tatiana Mushkarina, Evgenija Kuzmina, Tatiana Konstantinova, Ludmila Grivtsova
- Regulatory suppressor Treg cells in immunopathogenesis of radiation-induced pulmonary fibrosis** _____ **8**
Evgenija Kuzmina, Tatiana Mushkarina, Svetlana Zatsarenko, Larisa Kursova, Vladimir Pasov

RADIATION MEASUREMENTS

- Gamma tomography of geological samples** _____ **9**
David Zoul, Milan Zuna, Václava Havlová, Pavel Zháňal, Antonín Kolros, Ladislav Viererbl

Positron annihilation spectroscopy of irradiated polycarbonate _____ **10**

Markéta Koplová, David Zoul, Vít Rosnecký, Michal Košťál, Jakub Čížek

Testing of the measuring instruments in non-governmental networks for the purpose of environmental monitoring of ionising radiation _____ **11**

Nikola Kržanović, Miloš Živanović, Viacheslav Morosh, Stefan Neumaier, Annette Röttger, Giorgia Iurlaro, Steven Bell, Marco Sangiorgi, Olivera Ciraj-Bjelac, Gordana Pantelić, Miloš Đaletić, Luciano Sperandio, Sotiris Ioannidis

Influence of air gap and chamber positioning on radiotherapy chamber calibrations **12**

Nikola Kržanović, Miloš Živanović, Borislava Petrović, Srboljub Stanković, Olivera Ciraj-Bjelac, Miloš Đaletić

RADIATION PROTECTION

Activities of the Polish SSDL in radiation therapy _____ **13**

Wojciech Bulski, Wioletta Slusarczyk-Kacprzyk, Piotr Ulkowski, Iwona Grabska, Pawel Kukulowicz

Cumulative DLP (dose length product) exposure of oncology patients based on the data from the Dose Tracking System – Analysis of 8-year dose data _____ **14**

Agnieszka Kuchcinska, Wojciech Bulski, Konrad Pawlewicz, Agnieszka Kopec, Piotr Czuchraniuk, Karolina Wrzesien, Emilian Lewczuk, Elzbieta Lampka, Mateusz Spalek, Andrzej Jarząbski, Zbigniew Szutkowski, Dorota Kiprian

Analysis of the TOP20 highest cumulative DLP (dose length product) exposures of oncology patients based on the data from the dose tracking system and other sources of information _____ **15**

Agnieszka Kuchcinska, Wojciech Bulski, Konrad Pawlewicz, Bartłomiej Mirocha, Agnieszka Kopec, Piotr Czuchraniuk, Karolina Wrzesien, Emilian Lewczuk, Mateusz Spalek, Zbigniew Szutkowski, Dorota Kiprian

Tips and tricks to bear in mind while analyzing data from Dose Tracking System – Effective dose estimation issues _____ **16**

Agnieszka Kuchcińska, Wojciech Bulski

RADIOECOLOGY

The character of radionuclide contamination of the water bodies formed in emergency situations at the Semipalatinsk Test Site _____ **17**

Almira Aidarkhanova, Zhanna Tleukanova, Tatyana Bogatyreva, Saltanat Kumiskhanova

Estimation of the content of natural and artificial radionuclides in water bodies of the East Kazakhstan region _____ **18**

Ainur Mamyrbayeva, Almira Aidarkhanova, Yerzhan Tleukanov

Fukushima nuclear disaster _____ **19**

Masaki Tan

RADIATION DETECTORS

Optical and electrical characteristics of fabricated three-layered Al/Er₂O₃/Eu₂O₃/SiO₂/n-Si/Al MOS capacitors for radiation sensors _____ **20**

Saleh Abubakar, Ercan Yilmaz

MATERIAL SCIENCE

Effects of annealing temperature on the crystallographic, morphological and electrical characteristics of E-Beam-deposited Al/Eu₂O₃/n-Si (MOS) capacitors _____ 21

Ozan Yilmaz, Ercan Yilmaz

Investigation of electrical characteristics and surface morphology of vanadium oxide-VO₂ MOS devices _____ 22

Umutcan Gurer, Ercan Yilmaz

Frequency-dependent electrical characteristics of Er₂O₃/SiO₂/n-Si/Al MOS capacitor deposited by E-beam _____ 23

Alex Mutale, Ercan Yilmaz

Structural and electrical characteristics of the Al/Al₂O₃/SiO₂/n-Si metal-oxide-semiconductor capacitor _____ 24

Nakibinge Tawfiq Kimbugwe, Hüseyin Karaçalı, Ercan Yilmaz

Comparison of electrical properties of NÜR-PIN photodiode and BPW34 PIN photodiode _____ 25

Emre Doganci, Aliekber Aktağ, Ercan Yilmaz

Structural properties and radiation response of neodymium oxide _____ 26

Ramazan Lok, Erhan Budak, Ercan Yilmaz

Lowering synthesis temperature of Hbn by improvement of precursor _____ 27

Erhan Budak, Ramazan Lok, Ercan Yilmaz

MEDICAL PHYSICS

Radiobiological facility of the INR RAS for experiments on proton FLASH therapy __ 28

Sergey Akulinichev, Yuri Gavrilov, Dmitriy Kokontsev, Valeriia Martynova, Ivan Yakovlev

RADIOTHERAPY

Monte Carlo verification of ArcCHECK(R) detector output to radiation of Ir-192 sources in brachytherapy _____ 29

Adam Cichoński, Anna Wysocka-Rabin

RADIATION ONCOLOGY

Prevention of chemotherapy-induced nausea and vomiting (CINV) in breast cancer patients receiving adjuvant chemotherapy: Single institution experience _____ 30

Marina Iljovska, Snezhana Smichkoska, Emilija Lazareva, Violeta Klisarovska

Adjuvant chemotherapy plus concurrent chemoradiotherapy (CCRT) in advanced gastric adenocarcinoma treatment as standard of care _____ 31

Marina Iljovska, Snezhana Smichkoska, Emilija Lazareva, Violeta Klisarovska, Meri Berat

The role of P53 status in response to ionizing radiation _____ 32

Oleg Kuchur, Alexander Zavirskiy, Vadim Basharin, Alexander Shtil

CANCER RESEARCH

Cell ageing in dermal fibroblasts of patients with breast cancer and patients at risk of tumors _____ 33

Mirya Kuranova, Aleksandra Nozdracheva, Nadezhda Pleskach

γ H2AX and 53BP1 as the markers of cell response to DNA damage in cases of patients with breast cancer and people with an increased risk of cancer _____ 34

Aleksandra Nozdracheva, Nadezhda Pleskach, Mirya Kuranova

MICROWAVE, LASER, RF AND UV RADIATIONS

Exposure and risk assessment connected to the health and safety of workers in the production of electricity _____ 35

Michel Israel, Petya Ivanova, Mihaela Ivanova, Tsvetelina Shalamanova, Victoria Zaryabova

Measurement, exposure and risk assessment of sources of optical radiation in working environment _____ 36

Mihaela Ivanova, Michel Israel, Mariyana Stoynovska

Public concern of electromagnetic exposure in Bulgaria – A case study _____ 37

Victoria Zaryabova, Tsvetelina Shalamanova, Hristina Petkova, Michel Israel

BIOMEDICINE

Cut-off point values of the estimated central obesity index determined with dual-energy X-ray absorptiometry in diagnosing abdominal obesity in women _____ 38

Slavica Shubeska Stratrova, Sasha Mishevska Jovanovska

Computed tomographic diagnostic evaluation of the adrenal and pituitary adenomas in Syndrome and Morbus Cushing _____ 39

Slavica Shubeska Stratrova, Sasha Mishevska Jovanovska, Dejan Spasovski

BIOCHEMISTRY

Free fatty acid receptors as potential drug targets in therapy and treatment of Type 2 diabetes _____ 40

Šaćira Mandal

Involvement of Caspase-6 in radiation-induced apoptosis _____ 41

Tetiana Andriichuk, Nataliia Raksha, Tetiana Koval, Serhii Vakal, Ludmyla Ostapchenko

Redox-active Ni(II) complexes of 5-tritylbenzene-1,2-diol derivatives with antimycobacterial properties _____ 42

Kseniya Nabebina, Natalia Loginova, Tat'yana Koval'chuk-Rabchinskaya, Galina Ksendzova, Nikolai Osipovich

BIOMEDICAL ENGINEERING

Developing a novel approach for ECG classification using modified local binary patterns _____ 43

Ehsan Zeraatkar, Marsa Gholamian, Mehran Yazdi



Testing of the measuring instruments in non-governmental networks for the purpose of environmental monitoring of ionising radiation

Nikola Kržanović¹, Miloš Živanović¹, Viacheslav Morosh², Stefan Neumaier², Annette Röttger², Giorgia Iurlaro³, Steven Bell⁴, Marco Sangiorgi⁵, Olivera Ciraj-Bjelac¹, Gordana Pantelić¹, Miloš Đaletić¹, Luciano Sperandio³, Sotiris Ioannidis⁴

¹ Vinca Institute of Nuclear Sciences, Belgrade, Serbia

² Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

³ Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Rome, Italy

⁴ National Physics Laboratory Management Limited, Teddington, United Kingdom

⁵ European Commission – Joint Research Centre, Brussels, Belgium

Non-governmental networks for environmental monitoring employ a wide range of radiation protection instruments from different manufacturers, which provide the public with often unreliable dosimetric data. These Measuring Instruments in Non-governmental Networks (MINN) are mostly based on Geiger-Muller tube gas detectors, which represent low-cost easily operated instruments. An extensive testing of these devices was performed in order to validate the data acquired with MINN within the 16ENVO4 Preparedness EMPIR project. In total, 16 different dosimeter types were selected, with a sample size of four dosimeters per dosimeter type. Performance testing included the energy dependence and the linearity tests of the dosimeter response. Additionally, during the Researcher Mobility Grant associated with the 16ENVO4 project, two Geiger-Muller based dosimeter types, with a sample size of two dosimeters per type were included in the testing. These instruments were subjected to the angular dependence testing in both horizontal and vertical planes, besides the energy dependence and linearity tests in the reference Cs-137 field at Physikalisch-Technische Bundesanstalt (PTB). For all the dosimeter types, inherent background, response to secondary cosmic radiation and the response to small changes of dose rate were determined at the metrological facilities of PTB. The sensitivity of the measuring instruments used in non-governmental networks to small variations of the ambient dose equivalent rate was examined by exposing the dosimeters to low dose rate Cs-137, Co-60 and Ra-226 radiation sources, in order to estimate the effect of environmental radioactive contamination with artificially produced radionuclides. For the comparison purposes, besides the measuring instruments used in non-governmental networks, a previously characterized CdZnTe-based spectrodosimeter was irradiated with the aforementioned radiation fields. The measured values were compared with a reference Reuter-Stokes ionisation chamber used for low-dose rate level measurements.