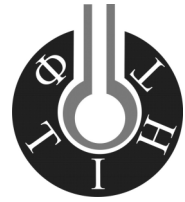




VI International Conference for Young Scientists
"LOW TEMPERATURE PHYSICS - 2015"
2 - 5 June 2015



Conference Program

&

Book of Abstracts

Kharkiv 2015

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CONFERENCE PROGRAM

TUESDAY, 2 JUNE

8:00-10:00

Registration

OPENING OF THE CONFERENCE

Director of the B.Verkin ILTPE NAS of Ukraine

10:00-10:15

Academician of the National Academy of Sciences of Ukraine
Sergey Gnatchenko

CONFERENCE HALL

PLENARY LECTURES OF INVITED SPEAKERS

Chair *Mariia Pashchenko*

10:15-11:00

HAMILTONIAN DYNAMICS AND BERRY PHASE

28

O.V. Usatenko

A.Ya. Usikov Institute for Radiophysics and Electronics, Kharkiv, Ukraine

11:15-11:30



General Photo and



Coffee Break

CONFERENCE HALL

ELECTRONIC PROPERTIES OF CONDUCTING AND SUPERCONDUCTING SYSTEMS

Chair *Yuriy Yerin*

11:30-11:45

**MANIFESTATION OF THE MAJORANA FERMIONS IN
TRANSPORT THROUGH ASYMMETRIC SINGLE-CHARGE
TRANSISTOR**

31

A.D. Shkop, A.V. Parafilo

B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

11:45-12:00

**FLUCTUATION CONDUCTIVITY AND PSEUDOGAP
TEMPERATURE DEPENDENCE CHANGING IN THE SLIGHTLY
DOPED YBCO SINGLE CRYSTALS UNDER PRESSURE**

32

L.V. Omelchenko¹, R.V. Vovk², Z.F. Nazyrov², A.L. Solovjov^{1,3}

¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

² *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*

³ *International Laboratory of High Magnetic Fields and Low Temperatures, Wroclaw, Poland*

12:00-12:15

**NONEQUILIBRIUM KINETICS OF ELECTRON-PHONON
SUBSYSTEM OF A CRYSTAL IN STRONG ELECTRIC FIELD**

33

V.E. Zakharov^{3,4}, V.I. Karas^{1,2}, A.M. Vlasenko¹

¹ *National Science Center «Kharkiv Institute of Physics and Technology», Kharkiv, Ukraine*

² *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*

³ *P.N. Lebedev Physical Institute, Moscow, Russia*

⁴ *L.D. Landau Institute for Theoretical Physics, Chernogolovka, Moscow Region, Russia*

- 12:15-12:30 ELECTRONIC STRUCTURE AND PECULIAR MAGNETIC PROPERTIES OF Fe_{1+y}Te COMPOUNDS** **34**
A.A. Lyogenkaya, A.V. Fedorchenko, A.V. Logosha, A.S. Panfilov, I.P. Zhuravleva
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

12:30-13:30



Lunch

CONFERENCE HALL

PLENARY LECTURES OF INVITED SPEAKERS

Chair Olena Vatazhuk

- 13:30-14:15 THE MAIN FEATURES OF PLASTIC DEFORMATION OF NANOMATERIALS** **22**
L.S. Fomenko
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

CONFERENCE HALL

LOW TEMPERATURE MATERIALS SCIENCE

Chair Olena Vatazhuk

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O.V. Kotlyar
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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A.P. Nazipova, S.V. Lebedev
V.N. Karazin Kharkiv National University 4 Svobody, Kharkiv, Ukraine
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Y.M. Plotnikova
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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A.V. Rusakova
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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R.V. Smolianets, V.A. Moskalenko, A.R. Smirnov
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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P.A. Zabrodin
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

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A MIXTURE OF SINGLE AND PAIRING HOPPINGS**

93

V.M. Travin, T.K. Kopec'

Institute of Low Temperature and Structure Research, Wroclaw, Poland

16:00-17:00

POSTER SESSION

WEDNESDAY, 3 JUNE

CONFERENCE HALL

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Chair Denis Laptev

- 10:00-10:45 EXPLORING THE THERMAL CONDUCTIVITY OF CRYOCRYSTALS 27**
 P. Stachowiak¹, V.V. Sumarokov², A.I. Krivchikov², E. Pisarska¹,
 T.V. Romanova¹, R.V. Nikonkov¹, A. Jeżowski¹
¹Institute of Low Temperature and Structure Research, Wrocław, Poland
²B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

10:45-11:00



Coffee Break

CONFERENCE HALL

PHYSICS OF NANOSTRUCTURES AND LOW DIMENSIONAL SYSTEMS

Chair Denis Laptev

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 D.V. Laptev
 B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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 B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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 M.S. Klochko
 B. Verkin Institute for Low Temperature Physics and Engineering of, Kharkiv, Ukraine
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 O.A. Ilinskaya
 B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 12:00-12:15 THE KINETICS OF FORMATION OF TRANSIENT CURRENTS IN
MOLECULAR PHOTODIODE 113**
 V.O. Leonov, E.G. Petrov, Ye.V. Shevchenko
 Bogolyubov Institute for Theoretical Physics, Kyiv, Ukraine
- 12:15-12:30 SUPPRESSION OF SCREENING OF THE POINT CHARGE
POTENTIAL BY ELECTRON-HOLE PAIRING 114**
 K.V. Germash, D.V. Fil
 Institute for Single Crystals, Kharkiv, Ukraine,

12:30-13:30



Lunch

13:30-14:30



LAB TOUR

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Chair *Maxim Barabashko*

- 14:30-15:15** **SUBSTITUTED MANGANITES AS SELF-CONTROLLED MEDIATORS OF MAGNETIC HYPERTHERMIA: STATE-OF-THE-ART RESEARCH AND PERSPECTIVES** **24**
A.I. Tovstolytkin
Institute of Magnetism, Kyiv, Ukraine

CONFERENCE HALL**PHYSICS OF NANOSTRUCTURES AND
LOW DIMENSIONAL SYSTEMS**

Chair *Maxim Barabashko*

- 15:15-15:30** **THE LOW TEMPERATURE HEAT CAPACITY OF ULTRAPURE FULLERITE C₆₀** **115**
M.S. Barabashko, M.I. Bagatskii, V.V. Sumarokov
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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M.V. Khlistuck¹, A.V. Dolbin¹, V.B. Esel'son¹, V.G. Gavrillo¹, N.A. Vinnikov¹, R.M. Basnukaeva¹, A.M. Benito²
¹ B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
² Instituto de Carboquímica, Zaragoza, Spain
- 15:45-16:00** **MODELING OF PHASE DYNAMICS AND KINETICS OF FRAGMENTATION AT SEVERE PLASTIC DEFORMATION** **117**
A.V. Khomenko¹, D.S. Troshchenko¹, L.S. Metlov²
¹ Sumy State University, Sumy, Ukraine
² Donetsk Institute for Physics and Engineering named after O.O. Galkin, Donetsk, Ukraine
- 16:00-16:15** **ZrC/Mg MULTILAYERS FOR RADIATION AT 30.4 nm** **118**
L.E. Konotopskyi, I.A. Kopylets
National Technical University «Kharkiv Polytechnic Institute», Kharkiv, Ukraine
- 16:15-16:30** **DIAGNOSTICS OF THE COMPOSITION AND SIZES OF Ar-Kr CLUSTERS** **119**
O.P. Konotop, O.G. Danylchenko, S.I. Kovalenko, V.N. Samovarov
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 16:30-16:45** **LUMINESCENCE CENTRES IN STOICHIOMETRIC AND NONSTOICHIOMETRIC CeO₂ NANOCRYSTALS** **120**
I. Ropakova, P. Maksymchuk, A. Masalov, I. Bespalova, O. Viagin, V. Seminko, N. Kononets, A. Aslanov, Yu. Malyukin
Institute for Scintillation Materials, Kharkiv, Ukraine



17:30-20:00

WELCOME PARTY

THURSDAY, 4 JUNE

CONFERENCE HALL

PLENARY LECTURES OF INVITED SPEAKERS

Chair *Sergii Poperezhai*

10:00-10:45 THE POINCARÉ SPHERE FOR CANCER DIAGNOSTICS 25

I. Meglinski
University of Otago, Otago, New Zealand

10:45-11:00



Coffee Break

CONFERENCE HALL

OPTICS, PHOTONICS, OPTICAL SPECTROSCOPY AT LOW TEMPERATURES

Chair *Sergii Poperezhai*

11:00-11:15 THE LINEAR ELECTRO-OPTICAL EFFECT IN $TmAl_3(BO_3)_4$ 57

M.I. Pashchenko¹, V.A. Bedarev¹, D.M. Merenkov¹, L.N. Bezmaternykh²,
V.L. Temerov²

¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

² *L.V. Kirensky Institute of Physics, Krasnoyarsk, Russian Federation*

11:15-11:30 STUDIES OF FAR IR SPECTRA OF THE CRYSTAL $KTm(MoO_4)_2$ 58

D. Kamenskyi², K. Kutko¹, P. Gogoi², H. Engelkamp², N. Zubenko¹,
S. Poperezhai¹

¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

² *Radboud University, Institute for Molecules and Materials, High Field Magnet Laboratory, Nijmegen, Netherlands*

11:30-11:45 ANGULAR TRANSFORMATION OF LASER BEAMS IN TWO-DIMENSIONAL PHOTONIC CRYSTAL WITH SURFACE DEFECT 59

V.A. Koliadenko, A.P. Ostroukh, R.A. Lymarenko, V.B. Taranenko

International center «Institute of Applied Optics», Kyiv, Ukraine

11:45-12:00 VECTOR BEAM FORMATION IN ISOTROPIC LASER WITH INTRACAVITY DIAPHRAGM 60

Ye.A. Krasnoshchekov, V.V. Yaparov, V.B. Taranenko

International center «Institute of Applied Optics», Kyiv, Ukraine

12:00-12:15 KDP SINGLE CRYSTAL DOPED WITH L-ARGININE AMINOACID 61

E.I. Kostenyukova, O.N. Bezkrovnaya

STC «Institute for Single Crystals», Kharkiv, Ukraine

12:15-13:15



LAB TOUR

13:15-14:15



Lunch

CONFERENCE HALL**PLENARY LECTURES OF INVITED SPEAKERS**

Chair *Valentina Zobnina*

- 14:15-15:00 TARGETING MEMBRANES WITH ANTIMICROBIAL PEPTIDES 26**
V.P. Berest, K.S. Lonhus
V.N. Karazin Kharkiv National University, Kharkiv, Ukraine

CONFERENCE HALL**LOW TEMPERATURE PHYSICS OF MACROMOLECULES,
BIOPHYSICS**

Chair *Valentina Zobnina*

- 15:00-15:15 EFFECT OF Zn²⁺ ION CONCENTRATION AND TEMPERATURE ON
THE CONFORMATIONAL EQUILIBRIUM OF SINGLE-STRANDED
polyU AND polyC 101**
E.L. Usenko, V.A. Sorokin, V.A. Valeev
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 15:15-15:30 TUNING OF LUMINESCENCE ENHANCEMENT FROM CARBON
NANOTUBES DUE TO AMINO ACID DOPING 102**
N.V. Kurnosov, V.S. Leontiev, V.A. Karachevtsev
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 15:30-15:45 ADSORPTION OF HETEROCYCLIC ORGANIC MOLECULES ON
GRAPHENE: DFT STUDY 103**
E.S. Zarudnev, S.G. Stepanian, V.A. Karachevtsev
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 15:45-16:00 FERMI RESONANCE IN THE VIBRATIONAL SPECTRA OF
5-CHLOROURACIL MOLECULES ISOLATED IN THE LOW
TEMPERATURE Ar MATRICES 104**
I.I. Shkapo¹, A.Yu. Ivanov², Yu.V. Rubin², V.A. Karachevtsev²
¹ *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*
² *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*
- 16:00-16:15 FEATURES OF DISTRIBUTION OF INTERMOLECULAR
COMPLEXES OF ORGANIC POLYETHERS WITH INORGANIC IONS
BASED ON MASS SPECTROMETRY AND COMPUTER SIMULATION 105**
V.G. Zobnina, O.A. Boryak, M.V. Kosevich
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

HALL "HELIUM"**YOUNG SCIENTISTS WORKSHOP
"INTERNATIONAL YEAR OF LIGHT"**

Chair *Mariia Pashchenko*

- 16:15-17:30 CELEBRATION OF "THE INTERNATIONAL YEAR OF LIGHT"**



INTERNATIONAL
YEAR OF LIGHT
2015

FRIDAY, 5 JUNE

CONFERENCE HALL
PLENARY LECTURES OF INVITED SPEAKERS

Chair *Mariia Pashchenko*

10:00-10:45 **LONG RANGE MAGNETIC ORDER IN $\text{RAI}_3(\text{BO}_3)_4$ (R = Dy, Tb) BORATES** **21**

T. Zajarniuk¹, A. Szewczyk¹, M.U. Gutowska¹, M.I. Pashchenko²,
V.A. Bedarev², S.L. Gnatchenko², L.N. Bezmaternykh³, V.L. Temerov³,
A.A. Prokhorov⁴, L.F. Chernysh⁴

¹ *Institute of Physics, Polish Academy of Sciences, Warsaw, Poland*

² *B.Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

³ *L.V. Kirensky Institute of Physics, Krasnoyarsk, Russia*

⁴ *Donetsk Institute for Physics and Engineering named after O.O. Galkin, Donetsk, Ukraine*

10:45-11:30 **A STUDY OF THE ELECTRICAL ACTIVITY OF He II AT THE EXCITATION OF SECOND SOUND WAVE** **23**

T.V. Chagovets

Institute of Physics ASCR, Prague, Czech Republic

11:30-11:45



Coffee Break

CONFERENCE HALL
LOW TEMPERATURE MAGNETISM, SPINTRONICS

Chair *Tatyana Gaydamak*

11:45-12:00 **ULTRASONIC IN Nd AND Sm FERROBORATES. MAGNETOPIEZOELECTRIC EFFECT** **47**

T.N. Gaydamak¹, G.A. Zvyagina¹, I.V. Bilych¹, K.R. Zhekov¹, I.A. Gudim²

¹ *B.Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

² *L.V. Kirensky Institute for Physics, Krasnoyarsk, Russia*

12:00-12:15 **EXCHANGE BIAS IN FM/AFM/FM TRILAYER** **45**

M.L. Pankratova¹, A.S. Kovalev^{1,2}

¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

² *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*

12:15-12:30 **MAGNETIC ORDERING OF THREE-COMPONENT ULTRACOLD FERMIONIC MIXTURES IN OPTICAL LATTICES** **46**

A.G. Sotnikov^{1,2}

¹ *Akhiezer Institute for Theoretical Physics, NSC KIPT, Kharkiv, Ukraine*

² *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*

12:30-12:45 **LOW-TEMPERATURE PHASE TRANSITIONS INDUCED BY THE MAGNETIC FIELD APPLIED IN THE BASAL PLANE OF THE $\text{Nd}_{0.9}\text{Dy}_{0.1}\text{Fe}_3(\text{BO}_3)_4$ FERROBORATE** **48**

M.P. Kolodyazhnaya¹, I.V. Bilych¹, K.R. Zhekov¹, G.A. Zvyagina¹,

A.A. Zvyagin¹, A.N. Bludov¹, V.A. Pashchenko¹, I.A. Gudim², E.V. Eremin²

¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

² *L.V. Kirensky Institute for Physics, Krasnoyarsk, Russia*

- 12:45-13:00 THE FORMATION LI_0 PHASE IN MULTILAYERED FILM
COMPOSITION $Pt(4,2nm)/Fe(3,2nm)]_{x4}/Al_2O_3$ 49**
K.V. Slipchenko, Yu. Makogon, M.Yu. Verbitskaja, O.V. Fihurna
National Technical University of Ukraine "Kiev Polytechnical Institute", Kiev, Ukraine

HALL "HELIUM"

**QUANTUM LIQUIDS AND QUANTUM CRYSTALS,
CRYOCRYSTALS**

Chair Ivan Gritsenko

- 11:45-12:00 THE DRAG COEFFICIENT OF THE OSCILLATING TUNING FORK
IMMERSED IN He II 69**
I. Gritsenko¹, A. Tseskis² and G. Sheshin¹
¹*B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*
²*Am Weidenbusch 29, 51381 Leverkusen, Germany*
- 12:00-12:15 CREEP FEATURES OF SOLID 3He AT TEMPERATURES BELOW 1K 70**
A.A. Lisunov, V.A. Maidanov, V.Yu. Rubanskyi, S.P. Rubets, V.A. Zhuchkov
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 12:15-12:30 VIRIAL COEFFICIENTS FOR QUANTUM GAS OF COMPOSITE
PARTICLES WITH INTERACTION. DEFORMATION-BASED
APPROACH 71**
Yu.A. Mishchenko, A.M. Gavrilik
Bogolyubov Institute for Theoretical Physics, Kyiv, Ukraine
- 12:30-12:45 STRUCTURAL STUDY OF THE FORMATION OF BINARY
CRYOALLOYS 72**
N.S. Mysko, V.V. Danchuk, A.A. Solodovnik, M.A. Strzhemechny
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- 12:45-13:00 ON THE THEORY OF BEREZINSKII-KOSTERLITZ-THOULESS
TRANSITION IN SUPERFLUID FILMS 73**
S.I. Shevchenko, A.S. Rukin
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine

The End

13:30-14:00

CLOSING

14:00-15:00



Lunch



15:00

CONCERT OF CLASSICAL MUSIC

16:00-17:00

**POSTER SESSION
TUESDAY, 2 JUNE**
ELECTRONIC PROPERTIES OF CONDUCTING AND SUPERCONDUCTING SYSTEMS

- P1** **MAGNETORESISTIVE PROPERTIES OF COMPACTED CrO₂ POWDERS DOPED WITH Fe** **35**
V.A. Horielyi, N.V. Dalakova, E.Yu. Beliayev
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- P2** **THE UPPER CRITICAL FIELD OF Dy_{0.6}Y_{0.4}Rh_{3.85}Ru_{0.15}B₄ SUPERCONDUCTOR** **36**
O.V. Mezhenka¹, A.V. Terekhov²
¹ *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*
² *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*
- P3** **FRACTAL-LIKE STRUCTURE OF MAGNETIC FIELD PENETRATION INTO SUPERCONDUCTING NbTi DISC: STOCHASTIC JUMPS OF FLUX BUNDLES AND MEISSNER HOLES** **37**
E.I. Kuchuk¹, V.V. Chabanenko¹, V.F. Rusakov², O.M. Chumak^{1,2}, I. Abal'osheva³
¹ *O. Galkin Donetsk Institute for Physics and Engineering, Donetsk, Ukraine*
² *Donetsk National University, Donetsk, Ukraine*
³ *Institute of Physics, Warsaw, Poland*
- P4** **STUDY OF POINT-CONTACT SPECTRA OF FeSe** **38**
N.V. Gamayunova, O.E. Kvitnitskaya, Yu.G. Naidyuk
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- P5** **STRONG DRIVING REGIME OF THE QUBIT-RESONATOR SYSTEM** **39**
D.S. Karpov¹, S.N. Shevchenko^{1,2}, A.N. Omelyanchouk¹, E. Il'ichev³
¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*
² *V.N. Karazin Kharkiv National University, Kharkiv, Ukraine*
³ *Leibniz Institute of Photonic Technology, Jena, Germany*
- P6** **UNUSUAL EFFECTS OF SILVER-MANGANITE COMPOSITE** **40**
V.V. Kononenko, V.Yu. Tarenkov, A.I. D'yachenko, V.N. Varyukhin
O. Galkin Donetsk Institute for Physics and Engineering, Donetsk, Ukraine.
- P7** **ELECTRONIC STRUCTURE AND ITINERANT ANTIFERROMAGNETISM OF FeGe₂** **41**
A.V. Logosha, A.A. Lyogenkaya, G.E. Grechnev
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
- P8** **DIMENSIONAL FEATURES OF PROPERTIES OF SUPERCONDUCTING SINGLE CRYSTALS FeTe_{0.65}Se_{0.35}** **42**
I. Dudar¹, A. Sivakov¹, S. Bondarenko¹, A. Pokhila¹, V. Koverya¹, A. Wishnevski², D. Gawryluk²
¹ *B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*
² *Institute of Physics, Warsaw, Poland*

LOW TEMPERATURE MAGNETISM, SPINTRONICS

- P9** **MAGNETIC PROPERTIES OF RFe₄Al₈ (R = Sc, Y, La, Ce, Lu) COMPOUNDS** **50**
I.P. Zhuravleva, A.A. Lyogenkaya, O.V. Kotlyar, A.V. Logosha,
A.V. Fedorchenko, I.S. Bondar, A.S. Panfilov
B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine
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