

# **60th Karpacz Winter School on Theoretical Physics & WE-Heraeus Physics School**



## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

# Phase Transitions in Neutron Stars - Lecture 1

*Wednesday, 22 May 2024 12:00 (1h 15m)*

**Presenter:** Dr BURGIO, Fiorella

**Session Classification:** Lectures

Contribution ID: 2

Type: **not specified**

## **Phase Transitions in Neutron Stars - Lecture 2**

*Thursday, 23 May 2024 09:00 (1h 15m)*

**Presenter:** Dr BURGIO, Fiorella

**Session Classification:** Lectures

Contribution ID: 3

Type: **not specified**

## **Colloquium Lecture "The fate of the Universe - New Results from JWST and outlook"**

*Thursday, 16 May 2024 17:00 (1h 15m)*

**Presenter:** Prof. HASINGER, Günther (DZA, Gorlitz)

**Session Classification:** Lectures

Contribution ID: 4

Type: **not specified**

# **Is Dark Matter made up of Primordial Black Holes? An update**

*Friday, 17 May 2024 09:00 (1h 15m)*

**Presenter:** Prof. HASINGER, Günther (DZA, Gorlitz)

**Session Classification:** Lectures

Contribution ID: 5

Type: **not specified**

# Critical Point and Dynamics of a Phase Transition in Heavy Ion Collisions - Lecture 1

*Friday, 17 May 2024 12:00 (1h 15m)*

**Presenter:** Prof. KAPUSTA, Joseph

**Session Classification:** Lectures

Contribution ID: 6

Type: **not specified**

## **Critical Point and Dynamics of a Phase Transition in Heavy Ion Collisions - Lecture 2**

*Saturday, 18 May 2024 12:00 (1h 15m)*

**Presenter:** Prof. KAPUSTA, Joseph

**Session Classification:** Lectures

Contribution ID: 7

Type: **not specified**

## **Critical Point and Dynamics of a Phase Transition in Heavy Ion Collisions - Lecture 3**

*Sunday, 19 May 2024 09:00 (1h 15m)*

**Presenter:** Prof. KAPUSTA, Joseph

**Session Classification:** Lectures



Contribution ID: 8

Type: **not specified**

# Quark Deconfinement in Supernova Explosions: How to probe it? - Lecture 1

*Thursday, 23 May 2024 15:00 (1h 15m)*

**Presenter:** Dr KURODA, Takami (Max-Planck-Institut für Gravitationsphysik, Potsdam)

**Session Classification:** Lectures

Contribution ID: 9

Type: **not specified**

## **Quark Deconfinement in Supernova Explosions: How to probe it? - Lecture 2**

*Friday, 24 May 2024 09:00 (1h 15m)*

**Presenter:** Dr KURODA, Takami (Max-Planck-Institut für Gravitationsphysik, Potsdam)

**Session Classification:** Lectures

Contribution ID: **10**

Type: **not specified**

## **Warm Dense Plasmas from Inertial Fusion to Planetary Interiors - Lecture 1**

*Friday, 17 May 2024 15:00 (1h 15m)*

**Presenter:** Prof. MILITZER, Burkhard (UC Berkeley)

**Session Classification:** Lectures

Contribution ID: 11

Type: **not specified**

## Warm Dense Plasmas from Inertial Fusion to Planetary Interiors - Lecture 2

*Saturday, 18 May 2024 15:00 (1h 15m)*

**Presenter:** Prof. MILITZER, Burkhard (UC Berkeley)

**Session Classification:** Lectures

Contribution ID: 12

Type: **not specified**

## Warm Dense Plasmas from Inertial Fusion to Planetary Interiors - Lecture 3

*Sunday, 19 May 2024 15:00 (1h 15m)*

**Presenter:** Prof. MILITZER, Burkhard (UC Berkeley)

**Session Classification:** Lectures

Contribution ID: 13

Type: **not specified**

# Topological Phases of Matter in and out of Equilibrium - Lecture 1

*Saturday, 18 May 2024 10:15 (1h 15m)*

**Presenter:** Prof. MOESSNER, Roderich (Max Planck Institute for the Physics of Complex Systems, Dresden)

**Session Classification:** Lectures

Contribution ID: 14

Type: **not specified**

## Topological Phases of Matter in and out of Equilibrium - Lecture 2

*Tuesday, 21 May 2024 09:00 (1h 15m)*

**Presenter:** Prof. MOESSNER, Roderich (Max Planck Institute for the Physics of Complex Systems, Dresden)

**Session Classification:** Lectures

Contribution ID: 15

Type: **not specified**

# **The Complexity of Neutron Star Matter: from the Liquid-Gas Phase Transition to Chiral Symmetry Breaking and Restoration - Lecture 1**

*Wednesday, 22 May 2024 09:00 (1h 15m)*

**Presenter:** Prof. PROVIDENCIA, Constanca (University of Coimbra)

**Session Classification:** Lectures



Contribution ID: 16

Type: **not specified**

## **The Complexity of Neutron Star Matter: from the Liquid-Gas Phase Transition to Chiral Symmetry Breaking and Restoration - Lecture 2**

*Thursday, 23 May 2024 12:00 (1h 15m)*

**Presenter:** Prof. PROVIDENCIA, Constanca (University of Coimbra)

**Session Classification:** Lectures

Contribution ID: 17

Type: **not specified**

# The Universality of Critical Behaviour - Lecture 1

*Friday, 17 May 2024 10:15 (1h 15m)*

**Presenter:** Prof. SATZ, Helmut (University of Bielefeld)

**Session Classification:** Lectures

Contribution ID: **18**

Type: **not specified**

## **The Universality of Critical Behaviour - Lecture 2**

*Saturday, 18 May 2024 09:00 (1h 15m)*

**Presenter:** Prof. SATZ, Helmut (University of Bielefeld)

**Session Classification:** Lectures

Contribution ID: 19

Type: **not specified**

# Correlations, Cluster Formation and Phase Transitions in Dense Fermion Systems - Lecture 1

*Sunday, 19 May 2024 12:00 (1h 15m)*

**Presenter:** Prof. RÖPKE, Gerd (Universitaet Rostock)

**Session Classification:** Lectures

Contribution ID: 20

Type: **not specified**

## **Correlations, Cluster Formation and Phase Transitions in Dense Fermion Systems - Lecture 2**

*Tuesday, 21 May 2024 12:00 (1h 15m)*

**Presenter:** Prof. RÖPKE, Gerd (Universitaet Rostock)

**Session Classification:** Lectures

Contribution ID: 21

Type: **not specified**

## **Correlations, Cluster Formation and Phase Transitions in Dense Fermion Systems - Lecture 3**

*Friday, 24 May 2024 12:00 (1h 15m)*

**Presenter:** Prof. RÖPKE, Gerd (Universitaet Rostock)

**Session Classification:** Lectures

Contribution ID: 22

Type: **not specified**

## **Phase Transitions in Neutron Stars - Tutorial**

*Thursday, 23 May 2024 10:15 (1h 15m)*

**Presenter:** Dr BURGIO, Fiorella

**Session Classification:** Tutorials

Contribution ID: 23

Type: **not specified**

## **Critical Point and Dynamics of a Phase Transition in Heavy Ion Collisions - Tutorial**

*Sunday, 19 May 2024 10:15 (1h 15m)*

**Presenter:** Prof. KAPUSTA, Joseph

**Session Classification:** Tutorials



Contribution ID: 25

Type: **not specified**

## **Quark Deconfinement in Supernova Explosions: How to probe it? - Tutorial**

*Friday, 24 May 2024 10:15 (1h 15m)*

**Presenter:** Dr KURODA, Takami (Max-Planck-Institut für Gravitationsphysik, Potsdam)

**Session Classification:** Tutorials

Contribution ID: 26

Type: **not specified**

# Warm Dense Plasmas from Inertial Fusion to Planetary Interiors - Tutorial 1

*Saturday, 18 May 2024 16:15 (1h 15m)*

**Presenter:** Prof. MILITZER, Burkhard (UC Berkeley)

**Session Classification:** Tutorials

Contribution ID: 27

Type: **not specified**

## Warm Dense Plasmas from Inertial Fusion to Planetary Interiors - Tutorial 2

*Sunday, 19 May 2024 16:15 (1h 15m)*

**Presenter:** Prof. MILITZER, Burkhard (UC Berkeley)

**Session Classification:** Tutorials

Contribution ID: 28

Type: **not specified**

## Topological Phases of Matter in and out of Equilibrium - Tutorial

*Tuesday, 21 May 2024 10:15 (1h 15m)*

**Presenter:** Prof. MOESSNER, Roderich (Max Planck Institute for the Physics of Complex Systems, Dresden)

**Session Classification:** Tutorials

Contribution ID: 29

Type: **not specified**

# **The Complexity of Neutron Star Matter: from the Liquid-Gas Phase Transition to Chiral Symmetry Breaking and Restoration - Tutorial**

*Wednesday, 22 May 2024 10:15 (1h 15m)*

**Presenter:** Prof. PROVIDENCIA, Constanca (University of Coimbra)

**Session Classification:** Tutorials

Contribution ID: **30**

Type: **not specified**

# **Correlations, Cluster Formation and Phase Transitions in Dense Fermion Systems - Tutorial 1**

*Tuesday, 21 May 2024 15:00 (1h 15m)*

**Presenter:** Prof. RÖPKE, Gerd (Universitaet Rostock)

**Session Classification:** Tutorials

Contribution ID: 31

Type: **not specified**

## **Correlations, Cluster Formation and Phase Transitions in Dense Fermion Systems - Tutorial 2**

*Friday, 24 May 2024 15:00 (1h 15m)*

**Presenter:** Prof. RÖPKE, Gerd (Universitaet Rostock)

**Session Classification:** Tutorials

Contribution ID: **32**

Type: **not specified**

## Welcome

*Thursday, 16 May 2024 15:00 (5 minutes)*

**Presenter:** Prof. BLASCHKE, David (University of Wrocław)

**Session Classification:** Opening



Contribution ID: **33**

Type: **not specified**

## Opening

*Thursday, 16 May 2024 15:05 (15 minutes)*

**Presenter:** Prof. FRYDRYSZAK, Andrzej (University of Wrocław)

**Session Classification:** Opening

Contribution ID: 34

Type: **not specified**

## Historical Remarks on Karpacz Winter Schools

*Thursday, 16 May 2024 15:20 (50 minutes)*

**Presenters:** Prof. PEKALSKI, Andrzej; Prof. LUKIERSKI, Jerzy (University of Wrocław); Prof. TURKO, Ludwik (University of Wrocław); Prof. GARBACZEWSKI, Piotr; Prof. KARWOWSKI, Witold

**Session Classification:** Opening

Contribution ID: 35

Type: **not specified**

## Free Contributions

*Thursday, 16 May 2024 16:10 (20 minutes)*

**Session Classification:** Opening

Contribution ID: **36**

Type: **not specified**

## **Publishing with PRC**

*Thursday, 23 May 2024 18:00 (40 minutes)*

**Presenter:** Prof. KAPUSTA, Joseph

**Session Classification:** WE-Heraeus Foundation & Scientific Publishing

Contribution ID: 37

Type: **not specified**

## The Wilhelm and Else Heraeus Foundation

*Thursday, 23 May 2024 18:50 (35 minutes)*

**Presenter:** Prof. BLASCHKE, David

**Session Classification:** WE-Heraeus Foundation & Scientific Publishing

Contribution ID: **38**

Type: **not specified**

## **Award ceremony for best poster and best talk prizes & Closing speech**

*Friday, 24 May 2024 16:15 (1h 15m)*

**Presenter:** Prof. BLASCHKE, David

**Session Classification:** Closing

Contribution ID: 39

Type: **not specified**

## **Non-Hermitian control of Hermitian waveguide arrays**

*Saturday, 18 May 2024 18:00 (15 minutes)*

**Presenter:** RIZOS, Spyros (National Technical University of Athens)

**Session Classification:** Short Presentations

Contribution ID: 40

Type: **not specified**

## Violation of Bell Inequalities on Quantum Computers

*Saturday, 18 May 2024 18:15 (15 minutes)*

**Presenter:** ŚLIWIŃSKI, Michał (Warsaw University of Technology)

**Session Classification:** Short Presentations



Contribution ID: 41

Type: **not specified**

## **Vacuum stresses and energy fluxes induced by a cosmic string in de Sitter spacetime**

*Saturday, 18 May 2024 18:30 (15 minutes)*

**Presenter:** KOTANJYAN, Vardazar

**Session Classification:** Short Presentations

Contribution ID: 42

Type: **not specified**

## **The footprint of nuclear saturation properties on the neutron star f mode oscillation frequencies: a machine learning approach**

*Saturday, 18 May 2024 18:45 (15 minutes)*

**Presenter:** Dr KUMAR, Deepak (Indian Institute of Science Education and Research)

**Session Classification:** Short Presentations

Contribution ID: 43

Type: **not specified**

## **Spectral properties of non-Abelian gauge theories both in and out-of-thermal equilibrium**

*Saturday, 18 May 2024 19:00 (15 minutes)*

**Presenter:** SHANKER, Ravi (The Institute of Mathematical Sciences)

**Session Classification:** Short Presentations

Contribution ID: 44

Type: **not specified**

## **Probing the onset of deconfinement: Hadron production properties in the NA61/SHINE experiment at CERN SPS**

*Sunday, 19 May 2024 18:00 (15 minutes)*

**Presenter:** ZHEREBTSOVA, Elizaveta (University of Wrocław)

**Session Classification:** Short Presentations

Contribution ID: 45

Type: **not specified**

## **Probing the shape of QGP droplet using high-pT tomography**

*Sunday, 19 May 2024 18:15 (15 minutes)*

**Presenter:** Dr KARMAKAR, Bithika (University of Wroclaw)

**Session Classification:** Short Presentations

Contribution ID: 46

Type: **not specified**

## Heavy quark momentum broadening in a non-Abelian plasma off-equilibrium

*Sunday, 19 May 2024 18:30 (15 minutes)*

**Presenter:** PANDEY, Harshit (The Institute of Mathematical Sciences)

**Session Classification:** Short Presentations

Contribution ID: 47

Type: **not specified**

## **General predictions of neutron star properties using unified relativistic mean-field equations of state**

*Sunday, 19 May 2024 18:45 (15 minutes)*

**Presenter:** SCURTO, Luigi (CFisUC, University of Coimbra)

**Session Classification:** Short Presentations

Contribution ID: 48

Type: **not specified**

## **Inclusion of bosonic dark matter in neutron star to satisfy the observable features induced by nuclear matter models**

*Thursday, 23 May 2024 17:30 (15 minutes)*

**Presenter:** RAFIEI KARKEVANDI, Davood (ICRANet-Isfahan, Isfahan University of Technology)

**Session Classification:** Short Presentations



Contribution ID: 49

Type: **not specified**

## **Nuclear pastas in neutron stars**

*Thursday, 23 May 2024 16:15 (15 minutes)*

**Presenter:** SHCHECHILIN, Nikolai (Universite Libre de Bruxelles)

**Session Classification:** Short Presentations

Contribution ID: 50

Type: **not specified**

## **The cooling processes and distribution of mass in neutron stars**

*Thursday, 23 May 2024 16:30 (15 minutes)*

**Presenter:** DAS, Harish Chandra (INFN Catania)

**Session Classification:** Short Presentations

Contribution ID: 51

Type: **not specified**

## **Effect of color superconductivity on QCD phase diagram**

*Sunday, 19 May 2024 19:00 (15 minutes)*

**Presenter:** SHUKLA, Udit (University of Wrocław)

**Session Classification:** Short Presentations

Contribution ID: 52

Type: **not specified**

# Hybrid star phenomenology from the properties of the special point

*Thursday, 23 May 2024 17:00 (15 minutes)*

**Presenter:** GÄRTLEIN, Christoph (University of Lisbon)

**Session Classification:** Short Presentations

Contribution ID: 53

Type: **not specified**

## **Simulations of massive star explosions driven by a first-order QCD phase transition Neutrino signal and gravitational wave mode analysis**

*Thursday, 23 May 2024 16:45 (15 minutes)*

**Presenter:** Ms KHOSRAVI LARGANI, Noshad (University of Wroclaw)

**Session Classification:** Short Presentations

Contribution ID: 54

Type: **not specified**

## Hybrid star phenomenology from the properties of the special point

*Tuesday, 21 May 2024 16:45 (45 minutes)*

**Primary author:** GÄRTLEIN, Christoph (University of Lisbon)

**Presenter:** GÄRTLEIN, Christoph (University of Lisbon)

**Session Classification:** Poster Session

Contribution ID: 55

Type: **not specified**

## **The effect of late-time heating in hybrid millisecond pulsars**

*Tuesday, 21 May 2024 16:45 (45 minutes)*

**Primary author:** PANASIUK, Pavlo

**Presenter:** PANASIUK, Pavlo

**Session Classification:** Poster Session

Contribution ID: 56

Type: **not specified**

## Hybrid Stars: Bayesian Approach with NJL

*Tuesday, 21 May 2024 16:45 (45 minutes)*

**Primary author:** ALBINO, Milena (Universidade de Coimbra)

**Presenter:** ALBINO, Milena (Universidade de Coimbra)

**Session Classification:** Poster Session



Contribution ID: 57

Type: **not specified**

## **Particle production in strong fields and Berry's phase**

*Tuesday, 21 May 2024 16:45 (45 minutes)*

**Primary author:** ASATRYAN, Levon (Yerevan State University)

**Presenter:** ASATRYAN, Levon (Yerevan State University)

**Session Classification:** Poster Session

Contribution ID: 58

Type: **not specified**

## **Bayesian analysis of the dense matter equation of state**

*Tuesday, 21 May 2024 16:45 (45 minutes)*

**Primary author:** Dr AYRIYAN, Alexander (University of Wrocław)

**Presenter:** Dr AYRIYAN, Alexander (University of Wrocław)

**Session Classification:** Poster Session

Contribution ID: 59

Type: **not specified**

## **Do Neutron Stars give us Nuclear Matter properties? Machine Learning answers**

*Tuesday, 21 May 2024 16:45 (45 minutes)*

**Primary author:** CARVALHO, Valéria (Universidade de Coimbra)

**Presenter:** CARVALHO, Valéria (Universidade de Coimbra)

**Session Classification:** Poster Session

Contribution ID: **60**

Type: **not specified**

## **Light Nuclei in hot stellar matter: calibrating their nuclear couplings using heavy-ion collisions data**

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** CUSTÓDIO, Tiago (University of Coimbra)

**Session Classification:** Poster Session

Contribution ID: **61**

Type: **not specified**

## **Hybrid star phenomenology from the properties of the special point**

**Presenter:** GÄRTLEIN, Christoph (University of Lisbon)

**Session Classification:** Poster Session

Contribution ID: 62

Type: **not specified**

# Violation of Bell Inequalities on Quantum Computers

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** ŚLIWIŃSKI, Michał (Warsaw University of Technology)

**Session Classification:** Poster Session

Contribution ID: 63

Type: **not specified**

## **Exploring Neutron Stars' Potential to Constrain the Mass of Bosonic Dark Matter**

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** SHAHRBAF MOTLAGH, Mahboubeh (University of Wroclaw)

**Session Classification:** Poster Session

Contribution ID: 64

Type: **not specified**

## **Zubarev Meets Bayes: Non-Equilibrium Pion Distribution Function in Heavy-Ion Collisions**

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** Mr VITIUK, Oleksandr (University of Wroclaw)

**Session Classification:** Poster Session



Contribution ID: 65

Type: **not specified**

## **Graphene motivated generalised 2+1D Gross-Neveu model**

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** Mr MAHATO, Biplab (University of Wrocław)

**Session Classification:** Poster Session

Contribution ID: 66

Type: **not specified**

## After Dinner Talk "Introduction to the movie 'Oppenheimer'"

*Wednesday, 22 May 2024 21:00 (45 minutes)*

**Presenter:** Prof. KAPUSTA, Joseph

Contribution ID: 67

Type: **not specified**

## Excursion program

Contribution ID: **68**

Type: **not specified**

## Excursion Program

*Monday, 20 May 2024 09:00 (30 minutes)*

**Primary author:** IVANYTSKYI, Oleksii

**Presenter:** IVANYTSKYI, Oleksii

Contribution ID: **69**

Type: **not specified**

# Journal of Subatomic Particles and Cosmology

*Thursday, 23 May 2024 18:40 (10 minutes)*

**Presenter:** Prof. SASAKI, Chihiro

**Session Classification:** WE-Heraeus Foundation & Scientific Publishing

Contribution ID: 70

Type: **not specified**

## **Superfluid fraction in the inner crust of neutron stars**

*Thursday, 23 May 2024 17:15 (15 minutes)*

**Presenter:** ALMIRANTE, Giorgio

**Session Classification:** Short Presentations

Contribution ID: 71

Type: **not specified**

## Poster Flash talks

*Tuesday, 21 May 2024 16:15 (30 minutes)*

Contribution ID: 72

Type: **not specified**

## **Electrical conductivity of warm neutron star crust in magnetic fields: Neutron-drip regime**

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** GEVORGYAN, Narine

**Session Classification:** Poster Session



Contribution ID: 73

Type: **not specified**

## **Infinite nuclear matterwithin the relativistic Hartree-Fock approximation**

*Tuesday, 21 May 2024 18:00 (45 minutes)*

**Presenter:** Mr SOKOŁOWSKI, Kamil (University of Wrocław)

**Session Classification:** Poster Session