Institute of Experimental Physics
Slovak Academy of Sciences
Watsonova 47, 040 01 Košice, SLOVAKIA
Tel.: +421-55-7922201, Fax: +421-55-6336292, E-mail: sekr@saske.sk

22th International workshop on theoretical physics

Small Triangle Meeting

25.10.2022 - 28.10.2022

Medzilaborce, Eurohotel

Slovakia

Tuesday

17:00 - 18:20	**Registration**
19:30 - 21.00	**General discussions**

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Wedneday

Chairman: **Vladimír Lisý**

COMPLEX SYSTEMS

09:30 - 10:05 **Tomáš Lučivjanský** invited
Dynamic isotropic percolation process: renormalization group analysis

10:05 - 10:40 **Andrej Ovsiannikov**
Convergent perturbation theory in field models. How does it work?

10:40 - 11:10 **Coffee break**

Chairman: **Martin Vaľa**

11:10 - 11:45 **Lukáš Mižišin**
Magnetohydrodynamics Turbulence: Renormalization analysis in higher orders

11:45 - 12:20 **Matej Kecer**
Influence of thermal fluctuations on anomalous kinetics of multi-species reaction-diffusion system

12:30 - 13:30 **LUNCH BREAK**

13:45 - 18:00 **EXURSION**

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Thursday

COMPLEX SYSTEMS

Chairman: **Norbert Kucerka**

09:30 - 10:05 **Vladimír Lisý** and **Jana Tóthová**
A simple approach to Langevin equations in the interpretation of experiments and simulations

10:05 - 10:40 **Richard Remecký**
Influence of a weak small-scale anisotropy on anomalous scaling in Kraichnan model of turbulence in the two-loop approximation

10:40 - 11:10 **Coffee break**

HIGH ENERGY and ATOMIC PHYSICS

Chairman:

11:10 - 11:45 **Martin Vaľa**
High Energy Physics experiment data processing with DAOS in multi-tier storage environment based on RSC Storage on-Demand

11:45 - 12:20 **Ivan Nebola**
Model phonon spectra and densities of NbSn3 and NbGe3 structure states

12:30 - 13:30 **LUNCH BREAK**

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CONDENSED MATTER and BIOPHYSICS

Chairman: **Peter Kopcansky**

14:00 - 14:35 **Norbert Kučerka** invited
Reorganization of Lipid Membranes Triggered by Amyloid-beta Peptides

14:35 - 15:10 **Ivo Šafařík** invited
Magnetically responsive (nano)textile: Preparation and application

15:10 – 15:35 **Kristina Zolochevska** and **Peter Kopcansky**
Interaction of Ferritin derivatives with lysozyme amyloid Fibrils

15:35 – 16:00 **Dmytro Miakota, Katarina Zakutanska, Natalalia Tomasovicova, Veronika Lackova, Peter Kopcansky**
Memory effect in 5CB liquid crystal based composites

16:00 - 16:30 **Coffee break**

CONDENSED MATTER

Chairman: **Milan Timko**

16:30 - 17:05 **Arkadiusz Jozefczak** invited
Nanoparticles and ultrasound

17:05 – 17:30 **Bassam Jameel**
Ultrasound study of high-viscous oil magnetic and non-magnetic suspensions

17:30 - 17:55 **Maksym Karpets , Michal Rajnak, Katarina Paulovicova, Milan Timko, Peter Kopcansky**
Influence of magnetic and electric field on magnetic fluids structure

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Friday

CONDENSED MATTER

Chairman: **Ivo Šafařík**

09:30 - 10:05 **Marzena Dzida** invited
Comparison of structure of ionanofluids with long and short multi-walled carbon nanotubes

10:05 - 10:30 **Krzysztof Cwynar**
Isobaric heat capacity of ionanofluids with carbon nanotubes

10:30 - 11:00 **Coffee break**

Chairman: **Arkadius Jozefczak**

11:00 - 11:25 **Łukasz Scheller**
Thermal conductivity of carbon nanotubes-based ionanofluids

11:25 – 12:00 **Rafał Bielas** invited
Pickering droplets heated in rotating and alternating magnetic fields

12:00 - 13:30 **LUNCH BREAK**

14:00-16:00 **General discussions and conclusion remarks**

16:30 **Departure**

Reorganization of Lipid Membranes Triggered by Amyloid-beta peptide

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Abstract

Alzheimer's disease (AD) is a conformational disease caused by the formation of senile plaques, consisting primarily of amyloid-beta (AB) peptides. The AB peptide is considered a key factor in AD ever since the discovery of the disease. The understanding of its damaging influence has however shifted recently from large fibrils observed in the inter-cellular environment to the small oligomers interacting with a cell membrane. By means of small angle neutron scattering (SANS), we have observed for the first time a spontaneous reformation of extruded unilamellar vesicles (EULVs) to discoidal bicelle-like structures (BLSs) and small unilamellar vesicles (SULVs). These changes in the membrane self-organization happen during the thermodynamic phase transitions of lipids and only in the presence of the peptide. We interpret the dramatic changes in the membrane's overall shape with parallel changes in its thickness as the AB triggered membrane damage and a consequent reorganization of its structure. The suggested process is consistent with an action of separate peptides or small size peptide oligomers rather than the result of large AB fibrils.

Acknowledgement: This work has been supported by the Russian Science Foundation under grant 19-72-20186.