

СЕМИНАР ПО ТЕОРИИ КОНДЕНСИРОВАННЫХ СРЕД

Очередное заседание семинара состоится

26 октября 2021 г. (вторник) в 16:00
в аудитории им. Блохинцева (4 этаж) и в Zoom

[https://us02web.zoom.us/j/86971177106?](https://us02web.zoom.us/j/86971177106?pwd=d1ZkcFBUEkVzTTdEd0FmSi9oeXExUT09)

pwd=d1ZkcFBUEkVzTTdEd0FmSi9oeXExUT09

Идентификатор конференции: 869 7117 7106

for password e-mail kolesnik@theor.jinr.ru or osipov@theor.jinr.ru



**Calculation of critical exponents and representative physical parameters of scaling behavior of stochastic systems by quantum field theory methods.
(in connection with the nomination for the JINR Prize)**

*L.Ts. Adzhemyan, N.V. Antonov, **M. Hnatič**, J. Honkonen, G. Kalagov, M. Kompaniets, T. Lučivjanský, L. Mižišin, M. Yu. Nalimov*

JINR Dubna, SPbSU St. Peterburg, University of Helsinki, National Defence University Helsinki, P.J. Šafarik University in Kosice, IEP SAS in Košice

Stochastic equations describing developed (magneto-) hydrodynamic turbulence, transport of admixtures, various phase transitions, as well as equations of kinetics of chemical reactions and percolation are investigated. Use of the methods of quantum field theory - renormalization theory, Feynman diagram technique and renormalization group (RG) - allows to find the asymptotic scaling regimes and to calculate the corresponding critical exponents and other measurable physical quantities. Within the framework of this approach, in various approximations in terms of the expansion parameters, anomalous exponents are calculated for the structure functions of the studied random fields and physically significant composite operators.

Violation of Kolmogorov scaling due to intermittency is shown within the framework of simple models for vector and scalar fields (concentration of admixture particles) advected by a given turbulent field. The Kolmogorov constant, Prandtl numbers and skewness factor are calculated. The influence of symmetry breaking (anisotropy, mirror symmetry breaking, compressibility) on the values of these parameters, the value of anomalous exponents and the stability of scaling regimes has been studied. The influence of random fluctuations of the medium, including turbulent fluctuations, on the stability of fixed points of RG describing phase transitions, chemical reactions, and percolation processes is investigated.