Contribution ID: **56** Type: **Oral**

Non-perturbative solutions of BBGKY hierarchy of evolution equations for colliding particles

From the moment the BBGKY hierarchy (Bogolyubov–Born–Green–Kirkwood–Yvon) was formulated in 1946 until the last decade, the solution to such a hierarchy of evolution equations has been represented in the form of an iteration series, i.e., expansion into a series constructed by perturbation theory methods. In particular, this representation of the solution is applied for the derivation of kinetic equations, the generally accepted method of derivation of which is the construction of the scaling asymptotics of the solution to the BBGKY hierarchy.

Recently, an approach has been developed for the rigorous derivation of kinetic equations for many particles interacting as hard spheres, based on the description of the evolution of observables and states [1-4]. This approach was successfully developed due to the use of non-perturbative solutions of the BBGKY hierarchy for systems of interacting particles.

In this talk, the structure of expansions that represent a non-perturbative solution of the Cauchy problem for the dual BBGKY hierarchy for observables of many hard spheres is substantiated, as well as expansions into series that represent a non-perturbative solution of the BBGKY hierarchy for their states.

1. Gerasimenko V.I., Gapyak I.V. Hard sphere dynamics and the Enskog equation // Kinetic and Related Models. – 2012. – Vol. 5, №3. – P. 459–484.
2. Гап'як І.В., Герасименко В.І. Узагальнене рівняння Фоккера – Планка для газу Енскоґа // Математичний вісник НТШ. –2012. – Т.9. – С. 23–43.
3. Gerasimenko V.I., Gapyak I.V. Low-density asymptotic behavior of observables of hard sphere fluids // Advances in Mathematical Physics. – 2018. – V.2018. – 17 p.
4. Gerasimenko V.I., Gapyak I.V. Boltzmann–Grad asymptotic behavior of collisional dynamics // Reviews in Mathematical Physics. – 2021. – V. 33, №2. – 32 p.

Primary author: GAPYAK, Igor (Taras Shevchenko National University of Kyiv)

Presenter: GAPYAK, Igor (Taras Shevchenko National University of Kyiv)

Session Classification: MATHEMATICS

Track Classification: MATHEMATICS