

# A short description of the proposed project work

We are going to develop a new perturbation scheme for the systems of hydrodynamic type. It is based on the notion that any bihamiltonian perturbation can be eliminated in all orders of the perturbative expansion by a proper change of coordinates.

This perturbation scheme reveals an important universality feature similar to the theory of critical phenomena in physics of condensed matter. The universality property specifies a model ODE for the leading term of asymptotics, which describes the basic bifurcations of solution. This universality property was mentioned in a number of examples: singular limits in the theory of waves with small dispersion, bifurcation of the shock wave fronts, dynamics of formation of the contrast structures. The model equations here are of Painlevé-type which describe the matching on different asymptotic modes.

The visit is planned to address the following aspects of the problem:

- development of new perturbation methods for hyperbolic systems
- proof of the universality properties, inherent to the asymptotics of these systems
- study of model equations (of Painlevé type or other), their integrability, asymptotics, bifurcation theory

These items are in line with recent works of the SISSA people (B.Dubrovin, T.Grava) and the applicants research interests.