

The magnetic field reconnection is a physical process occurring in plasmas and electric current conducting fluids. The process is characterized by the change in the magnetic field configuration. As a result of the reconnection plasma or fluid elements that formerly shared one magnetic field line become occupying different field lines.

The objective of the project is a continual development of the magnetic reconnection theory as well as the analysis of mathematical equations describing the theory. In the research the so called Euler potentials formalism will be used. In general, it is a method of describing the magnetic field in a geometrically simple manner and which is also mathematically simple in certain physical conditions.

The equations considered in the project will be analyzed with respect to their perturbations and the stability analysis of the equations will be conducted. The results of the theoretical analysis will be applied to develop the magnetic field and the magnetic reconnection model in the outside of the heliosphere region, that is in a region just outside the boundaries of the solar wind reach. The expected results will have an impact on the magnetic reconnection theory development, they will help to understand the reconnection phenomenon and will assist in determining regions of physical systems that are favorable for the magnetic reconnection to occur. In particular, the results will help in understanding of the configuration and evolution of the magnetic field outside the heliosphere boundaries.