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The ROY project: simulations and extended techniques

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The key features of the project ROY are the multi-point synchronous measurements of plasma inhomogeneities in the regions of strong plasma turbulence and magnetic field annihilation. The radio-tomographic experiment is addressed mostly to obtain non-local plane (or crude 3D) distributions of plasma density between satellites.
Understanding strong constraints for this experiment following from the environment conditions, the careful estimation of the experiment parameters was made. A method for determination of the plasma velocity relative to multi-spacecraft systems is considered. The correlation estimates were provided for both absolute values and directions of the plasma velocity. Simulation of tomographic reconstruction was carried out using several models. It is shown that even for few (three) projections it is possible to recover global structure of irregularities.
The results represent following steps in the development of a new measurement technique - the MW radio-tomography in outer magnetosphere. Implementation of other experimental techniques (e.g. tethered subsutellites/microsatellites) is also considered.
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