



ISS experiment GeoFlow: first steps of data evaluation

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Topic of the GeoFlow experiment is the investigation of convection in rotating, self-gravitating spherical shells under microgravity. The central symmetry buoyancy field is generated by means of a spherical symmetric electric field acting in a dielectric insulating liquid. Herewith microgravity conditions are necessary. The GeoFlow experiment is actually running on orbit in the European COLUMBUS module of International Space Station ISS, delivering the first data sets. Here we present a summary of numerical predicted dynamics, the first images of runs and some first evaluation steps in comparison to numerical data.

For discussion of the dynamics the experiment is splitted into non-rotating and rotating cases. The non-rotating case is characterized by co-existing of several modes, with a strong influence of initial conditions to reach axisymmetric, cubic or solutions of mode numer 5. Route to chaos is direct from steady states to irregular convective flow. For the non-rotating case we find different routes to chaos from steady via periodic to irregular states. Patterns of convection show a higher mode number for higher parameter regime. Convection cells align at the tangent cylinder of rapid rotation regime.

For the proceeding of the experiment there is the actual aspect in organizing the amount of data consisting of images (interferograms) and so called telemetry (parameter values) data, which is estimated to be approximately 700 GB. By means of a data base this data has to be synchronized. Then a first classification of time behaviour in matching the numerical prediction has to be started. Spherical projection of image data has to be developed. With those tools sub- and supercritical regimes are identified for some selected data.