

Abstract Submitted
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Critical-band vortex in a precessing sphere¹ SHIGEO KIDA,
Doshisha University — We consider the motion of an incompressible viscous fluid in a rotating sphere with strong precession, where the spin and precession axes are assumed to be orthogonal to each other. By an asymptotic analysis we determine the structure of the steady flow in the entire sphere in the leading order of the asymptotic expansion. It is found that the boundary layer is developed on the whole spherical surface, outside of which the flow is stationary in the leading order. The boundary-layer approximation breaks down on a great circle perpendicular to the precession axis. A partial differential equation which describes the velocity field in the vicinity of this great circle, called the critical band, is derived theoretically and solved numerically to find a pair of vortices localized in the critical band. In the meeting we present the three-dimensional structure of these vortices with streamlines as well as streamsurfaces.

¹Numerical computation in this work was carried out at the Yukawa Institute Computer Facility.

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