Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

**Rimming flows and pattern formation inside rapidly rotating cylinder**[1] DENIS POLEZHAEV, VERONIKA DYAKOVA, VICTOR KOZLOV, Perm State Humanitarian Pedagogical University — The dynamics of fluid and granular medium in a rotating horizontal cylinder is experimentally studied. In a rapidly rotating cylinder liquid and granular medium coat the cylindrical wall under centrifugal force. In the cavity frame gravity field performs rotation and produces oscillatory fluid flow which is responsible for the series of novel effects of pattern formation, namely, axial segregation of heavy particles and pattern formation in the form of sand regular hills extended along the axis of rotation. At least two types of axial segregation are found: a) patterns of spatial period of the same order of magnitude as fluid layer thickness which induced by steady flows generated by inertial waves; b) fine patterns which manifests Gortler - Taylor vortices developing as a consequence of centrifugal instability of viscous boundary layer near the cylindrical wall. Under gravity, intensive fluid shear flow induces partial fluidization of annular layer of granular medium. The oscillatory motion is followed by onset of regular ripples extended along the axis of rotation.

[1]The work is supported by Russian Scientific Foundation (project 14-11-00476)

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Date submitted: 01 Aug 2014 Electronic form version 1.4