Indian Institute of Technology Kanpur
Chandrakanta Kesavan Lecture Series

April 04, 2024(Thursday) | **05:15-06:15 PM** | **LH-14**

Speaker : Dr Rodion Stepanov

WRF simulations of mid-latitude atmospheric waves

About the Talk

Transient large-scale (about 1000 km) high- and low-pressure structures in the atmosphere control weather in the mid-latitudes. The extreme weather events (precipitation, wind, temperature) are strongly linked to the strong extratropical cyclones, while blocking anticyclones may lead to extreme warm temperature anomalies. Deep understanding of dynamics and characteristics of the mid-latitude transient structures is necessary to improve the forecast of weather, storm track evolution, and future climate trends. A powerful tool for exploring different aspects of atmospheric circulation is the Weather Research and Forecasting (WRF) model, which is an open-source, with a set of physically realistic parameterization schemes. Usually, WRF studies are focused on weather processes in a localized region but WRF model supports atmospheric simulations across scales from large-eddy (10 km) to global. We presented results of 4-year global WRF simulation with idealized boundary - the combination of equatorial oceanic and polar desert zones provided. It results to the large-scale atmospheric circulation, which is similar to the Earth global circulation, and formation of baroclinic eddies in mid-latitudes. Special attention is focused on characteristics of baroclinic waves. We analyzed seasonal variations of wave energy, heat fluxes and provided mode analysis, including phase speed and amplitudes of the primary wave modes.

About the Speaker

Prof. Rodion Stepanov is at the Institute of Continuous Media Mechanics of Russian Academy of Science and Perm National Research Polytechnic University. He is the honored professor of Russian Academy of Science. His research interests are theory of turbulence, dynamo theory, numerical methods in magnetohydrodynamics, wavelet analysis.

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