

Western University
DEPARTMENT OF PHYSICS AND ASTRONOMY

ELIZABETH LAIRD MEMORIAL LECTURE

Wednesday, 27th May 2015

4:30 p.m.

Physics and Astronomy Bldg. Room 106

Reception to follow in PAB Atrium

Dr. Olga Popova

Institute for Dynamics of Geospheres
Russian Academy of Sciences, Moscow

“The Chelyabinsk Meteoroid Entry and Airburst Damage”

Abstract:

On 15 February 2013, a meteoroid struck the atmosphere above the city of Chelyabinsk with as much energy as half a million tonnes of TNT, causing widespread injuries and damage to buildings. A review of what was learned about the airburst by field studies, the analysis of recovered meteorites, and numerical models of meteoroid fragmentation and airburst propagation will be given. The only meteoroid impact events with comparable or larger energy in recent times include the 0.5 Mt-sized, 3 August 1963 meteor over the south Atlantic—for which only an infrasound signal was recorded—and the famous Tunguska impact of 1908. Estimates of the initial kinetic energy of the Tunguska impact range from 3 to 50 Mt, due to the lack of good observations at the time.

The Chelyabinsk event is, by far, the best documented big impact, and provides a unique opportunity to calibrate the different approaches used to model meteoroid entry and to calculate the damaging effects of a shock wave from a large meteoroid impact. A better understanding of what happened might help future impact hazard mitigation efforts by calibrating models of what might happen under slightly different circumstances.