



Western University
Department of Physics and Astronomy

PHYSICS & ASTRONOMY COLLOQUIUM

Date: TUESDAY, 19 March 2019

Time: 1:30 p.m.

Location: Physics & Astronomy Seminar Room 100

Dr. Nikodem Poplawski

Department of Mathematics and Physics
University of New Haven, CT

“Big bounce and inflation from spin and torsion”

ABSTRACT

The conservation law for the total (orbital plus spin) angular momentum of a Dirac particle in the presence of gravity requires that spacetime is not only curved, but also has a nonzero torsion. The coupling between the spin and torsion in the Einstein–Cartan theory of gravity generates gravitational repulsion at extremely high densities, which prevents a singularity in a black hole and may create there a new, closed, baby universe undergoing one or more nonsingular bounces. We show that quantum particle production caused by an extremely high curvature near a bounce creates enormous amounts of matter and can generate a finite period of inflation. Our scenario has only one parameter, does not depend significantly on the initial conditions, does not involve hypothetical scalar fields, avoids eternal inflation, and predicts plateau-like inflation that is supported by the Planck observations of the cosmic microwave background. This scenario suggests that our Universe may have originated from a nonsingular bounce in a black hole existing in another universe.

HOST: R. Valluri

COFFEE + light snacks will be available in the Atrium, 2nd floor, at 1:15 p.m.