

## PHYSICS AND ASTRONOMY SEMINAR

## **Dr. Jonathan Ziprick**

University of Winnipeg

## "Discrete Gravity"

## Abstract

Gravity is the only physical interaction lacking a quantum theory. Classically, general relativity describes gravitation in terms of the geometry of spacetime. Quantization techniques which work well for fields defined on fixed geometry, fail when applied to the geometry itself.

Here we attempt to get around this problem by rewriting general relativity as a discrete theory in order to make it amenable to standard quantization techniques. We do this by defining space (at fixed time) as a simplicial complex -- a set of tetrahedral cells glued together along faces. While the interior of each cell is flat, curvature is present at the boundaries, and smoothly curved geometry is recovered in the many-cell limit. The benefit is that for a fixed number of cells, there are a finite number of parameters defining spacetime, and these can be quantized by standard techniques.

Tuesday, February 20, 2018 2:00 p.m. Elliott Building Room 162