



PHYSICS AND ASTRONOMY SEMINAR

Dr. Jason Loeppky

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“Comparing Simulated Emission from Molecular Clouds Using Experimental Design”

Joint work with: Erik Rosolowsky, Stella Offner, Miayan Yeremi and Mallory Flynn

Abstract

In this talk, I will discuss an interdisciplinary approach to the problem of understanding star formation. Since star formation is governed by multiple physical processes such as magnetism, turbulence and gravitation, it must be studied using numerical models. These numerical models attempt to accurately emulate the structure observed in actual star-forming molecular clouds. We utilize the methodology of experimental design, a subfield of statistical analysis, to establish a framework for comparing position-position-velocity data cubes. Using this framework, we show how various metrics designed for comparing position-position-velocity data cubes are sensitive to changes in the initial parameters of the simulations. We discuss how some of these changes are related the way in which the position-position-velocity data cube is treated. In addition we highlight the shortcomings of one-factor-at-a-time designs commonly used in astrophysics and propose fractional factorial designs as a means to rigorously examine the effects of changing physical properties while minimizing the investment of computational resources.

Tuesday, September 24, 2013

3:30 p.m.

Elliott Building

Room 161