



PHYSICS AND ASTRONOMY SEMINAR

Dr. Ari Belenkiy

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“The Waters I Am Entering No One Yet Has Crossed: Alexander Friedman and the Origins of Modern Cosmology”

Abstract

Ninety years ago, in 1922, Alexander Friedman (1888-1925) demonstrated for the first time that the General Relativity equations admit non-static solutions and thus the Universe may expand, contract, collapse, and even be born. The fundamental equations he derived still provide the basis for the current cosmological theories of the Big Bang and the Accelerating Universe. Later, in 1924, he was the first to realize that General Relativity allows the Universe to be infinite, thus adding another dimension to Einstein's original theory. Friedman's ideas initially met strong resistance from Einstein, yet from 1931 the creator of General Relativity became their staunchest supporter.

After a general introduction to the subject, I intend to describe Friedman's little known topological and astronomical ideas of how to check General Relativity in practice. Recently discovered corpus of Friedman's writings in the Ehrenfest Archives at Leiden University sheds some new light on the circumstances surrounding the writing of his 1922 work and his relations with Paul Ehrenfest. I explain the origin of double “n” in Friedman's name. Finally, I connect Friedman's cosmological ideas with the 1998-2004 astronomical observations that led to the 2011 Nobel Prize in Physics. Because of the recent debates among science historians, I compare Friedman's contributions to those of Georges Lemaitre.

Monday, June 03, 2013

2:00 p.m.

Elliott Building

Room 105