



Karl Herzfeld Memorial Lecture

Department of Physics

THE CATHOLIC UNIVERSITY OF AMERICA

The asymmetry between matter and antimatter in the universe and in the laws of physics

presented by:

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and

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A major puzzle at the intersection of particle physics and cosmology is the asymmetry between matter and antimatter: the universe contains significant amounts of matter and an insignificant amount of antimatter. The puzzle is how this can occur when the laws of physics for matter and antimatter are nearly identical. This talk will posit that the asymmetry arises from an asymmetry between matter and antimatter in the *laws* of physics, so-called CP violation. In the Standard Model of particle physics, CP violation can appear in only two places, one affecting heavy quark decays and the other, which enters only after the theory is expanded to include neutrino masses, affecting heavy neutrino decays. The status of experiments aimed investigating these features and their implications for the evolution of matter-antimatter asymmetry will be discussed. The inevitable conclusion is that the current theory must be extended to give the observed universe.

Friday, March 11, 2005

in the Karl Herzfeld Auditorium of Hannan Hall – Room 108

4:00 p.m.

Reception immediately following lecture
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