

# SPECIAL AMO PHYSICS SEMINAR

## “A World without Time: Einstein and Gödel, Two Giants”

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### Abstract

In the last phase of his life Albert Einstein had a single close friend in Princeton. It was the mathematician Kurt Gödel who has shattered the world with his incompleteness theorems. Stimulated by discussions with Einstein during their numerous walks, Gödel made a discovery in 1949 which is as revolutionary as his theorems in mathematics: An exact cosmological solution of Einstein's field equations of gravitation with closed world lines. Therefore, general relativity does not exclude time travel and one could in principle go back into one's own past. The resulting metric corresponds to a universe with a rotating matter distribution. In this talk we compare various concepts of rotation starting from Newtonian mechanics and general relativity, and discuss experiments to measure this rotation. In here, the Gödel model plays a central role. In addition, we briefly summarize the life of Kurt Gödel.

**Thursday, May 15, 2008  
10:30 a.m. Room 501  
Engineering and Physics Building**

**Texas A&M University  
Institute for Quantum Studies**

Pizza party to follow in area outside 4<sup>th</sup> floor stairwell (12:00 p.m.).

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#### References:

- K. Gödel, An Example of a New Type of Cosmological Solutions of Einstein's Field Equations of Gravitation, *Rev. Mod. Phys.* 21, 447 (1949).  
A. Delgado, W.P. Schleich und G. Süßmann, Quantum Gyroscopes and Gödel's Universe: Entanglement Opens a New Testing Ground for Cosmology, *New Journal of Physics* 4, 37.1-37.8 (2002).  
E. Kajari, R. Walser, A. Delgado, and W.P. Schleich, Sagnac Effect of Gödel's Universe, *Gen. Rel. Grav.* 36, 2289 (2004).