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WEEKLY CALENDAR

Physics & Astronomy

202 Nicholson Hall



Louisiana State University

September 20, 2004

Tel: (225) 578-2261

Fax (225) 578-5855



GENERAL SEMINAR

"Physics of Type Ia Supernovae and Cosmology"

Dr. Peter Hoeflich

University of Texas - Austin

Thursday, September 23, 2004, 3:40 PM in Room 109 Nicholson Hall

Host: Dr. Brad Schaefer

(Refreshments served at 3:15p.m. in Room 229 Nicholson)

ABSTRACT

The last decade has witnessed an explosive growth of high-quality data for supernovae. Advances in computational methods provided new insights into the physics of the objects. Both trends combined provided spectacular results not only for astronomy but also for high energy and particle physics. Type Ia supernovae (SNe Ia) turned out to be excellent distance indicators due to their brightness and apparent homogeneity, and we start to understand why this is the case. SNe Ia observations have allowed good estimates of the Hubble constant, and provided strong evidence of the need for a Cosmological Constant. The quest for the nature of the dark energy requires even higher accuracy cosmology and supernovae at even larger red-shifts. Among others, possible candidates are the cosmological constant, vacuum energy, or gravitational waves. For the most distance supernovae, we are looking back in time by about 10,000,000,000 yrs which makes the systematic and evolutionary effects in the SNe-Ia population a major source of concern. A better understanding of SNe Ia is required to advance these fields. In the talk, I want to give an overview of the current status and the upcoming challenges.



PUBLICATIONS



Reply to "Comment on 'Quantum measurement and decoherence'" G. W. Ford and R. F. O'Connell, *Physical Review A* 70, 026102 (2004).

"Wigner Distribution Function Analysis of a Schrodinger Cat Superposition of Displaced Equilibrium Coherent States", G.W. Ford and R.F. O'Connell, in *Proceedings of the Wigner Centennial Conference, Acta Phys. Hung B Quantum Electronics*, 20/1-2 (2004) 91-94.

"Detector description and performance for the first coincidence observations between LIGO and GEO," V. Chickarmane, E. Daw, et al, *Nuclear Instruments and Methods in Physics Research A* 517 (2004) 154-179.

"Setting upper limits on the strength of periodic gravitational waves from PSR J1939+2134 using the first science data from the GEO 600 and LIGO detectors, V. Chickarmane, E. Daw, J.A. Giaime, G. Gonzalez, W. O. Hamilton, W.W. Johnson, et al., *Physical Review D* 69, 082004 (2004).

"Analysis of first LIGO science data for stochastic gravitational waves," V. Chickarmane, E. Daw, J.A. Giaime, G. Gonzalez, W. O. Hamilton, W.W. Johnson, et al., *Physical Review D* 69, 122004 (2004).

"First upper limits from LIGO on gravitational wave bursts," V. Chickarmane, E. Daw, J.A. Giaime, G. Gonzalez, W. O. Hamilton, W.W. Johnson, et al., *Physical Review D* 69, 102001 (2004).

"Analysis of LIGO data for gravitational waves from binary neutron stars," V. Chickarmane, E. Daw, J.A. Giaime, G. Gonzalez, W. O. Hamilton, W.W. Johnson, et al., *Physical Review D* 69, 12001 (2004).

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