

PHYSICS COLLOQUIUM (Joint with Astronomy)

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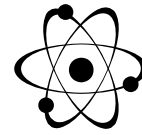
“The New Science of Gravitational Waves with LISA”

Monday, 1/29

4:00 P.M., Ronald Geballe Auditorium, A-102, PAA

Reception at 3:45 P.M. in the lobby

seminars



Jan 29- Feb 2, 2007

Abstract:

The Laser Interferometer Space Antenna (LISA) will directly sense motions of distant matter by detecting vibrations in spacetime called gravitational waves (unlike all of science up to now, which has studied the universe using particles and fields, such as electromagnetism). In LISA's broad frequency band around a millihertz, the universe is richly populated with strong gravitational wave sources. The strongest will be hundreds of inspiral and merger events of massive binary black holes, which LISA will detect with signal to noise ratio of well over 100 from the whole history of galaxy formation back to redshift of about 20. These events record the dynamics of strong-field relativity-- pure vacuum spacetime interacting with itself. They are the most violent possible occurrences in physics; each event has a peak power of around 10^{49} watts or 1000 times more than all the stars in the universe. Nevertheless, LISA waveforms give precise, gravitationally calibrated measurements of all the parameters of the systems: their masses, spins, orbital parameters, and even their direction and distance to much better than one percent precision. The talk will summarize the new opportunities for exploration and discovery in physics, astrophysics, astronomy, and cosmology that will emerge from LISA, and give a brief synopsis of the mission design and implementation status.

Tuesday, 1/30

Particle Theory Seminar Dongsu Bak, UW, University of Seoul

2:30 P.M., Rm. C-421, PAT “Time Dependent Black Holes and Thermal Equilibration”

Condensed Matter Seminar David Thouless, UW Physics

4:00 P.M., Rm. C-420, PAT “The Mass of a Vortex in a Superfluid”

Thursday, 2/1

Astronomy Colloquium Claire Max, UC Santa Cruz/Lick Observatory

4:00 P.M., Rm. A-102, PAA “Nearby Active Galactic Nuclei seen with Keck Telescope Adaptive Optics: A Sharper Image”