



THE NEW



# Astronomy OF LIGO

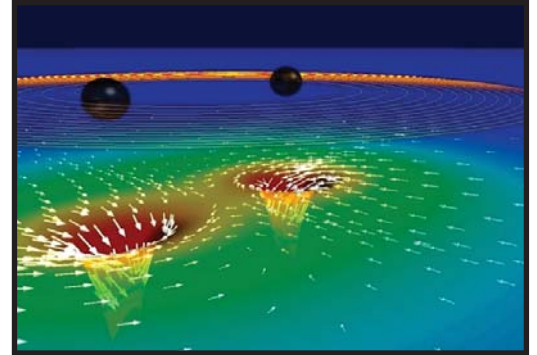


*Dr. Duncan Brown, Syracuse University*

*7:30 p.m., Wednesday, July 27*

*Union Auditorium, 14th & R, UNL City Campus*

**Abstract:** Gravitational waves are among the most remarkable predictions of Einstein's theory of general relativity. These waves—ripples in the curvature of spacetime—carry information about the changing gravitational fields of distant objects. Almost a century after Einstein first predicted the existence of gravitational waves, scientists are on the brink of directly detecting them for the first time. Gravitational waves will be a radically new tool for exploring fundamental physics and astronomy. They will probe the physics driving the most violent astrophysical events in the universe (such as merging black holes, image right) in ways inaccessible to electromagnetic observations. When the gravitational-wave window on the universe opens, the potential for discovery will be immense.



Construction of the U.S. Advanced Laser Interferometer Gravitational-wave Observatory (LIGO) is well under way (photo bottom right). Within the next five years, observers at Advanced LIGO expect to make the first detections of gravitational waves. Gravitational waves produced by the collision of black holes, asymmetric core collapse supernovae, rapidly spinning neutron stars, and even by the Big Bang itself are targets for detection in the years to come. I will give an overview of the new field of gravitational-wave astronomy: how the waves are generated, our efforts to detect them and what we hope to achieve when we can observe the universe in this new way.



*A public talk held in conjunction with the  
**Using Astronomy to Teach Physics**  
workshop sponsored by CATS, the Community  
of Astronomy Teaching Scholars  
endorsed by the APS and the AAPT*