



College of  
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& Astronomy

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## Weekly Calendar

February 29- March 4, 2016

### Departmental Colloquium

#### " A Decade of Super-Luminous Supernova Discoveries: The Physics of Extreme Stellar Catastrophes"

**3:30 PM Thursday, March 3, 2016**

**109 Nicholson Hall**

**Manos Chatzopoulos**  
University of Chicago

**Host: Juhan Frank**

• Refreshments served at 3:10 PM in 232 (Library) Nicholson Hall •

It has been 10 years since the discovery of a new class of stellar explosions, 10-100 times brighter than typical core-collapse supernovae. This new class of super-luminous supernovae challenges our understanding of the physics of massive stellar death and the environments around massive stars. The diversity of these luminous transients in terms of their peak luminosity, light curve shape and spectroscopic properties is striking and call for deeper understanding. I will present analytical calculations and numerical supercomputer simulations of different power input mechanisms that aim to reproduce the observed properties of super-luminous supernovae: pair-instability explosions, massive circumstellar interaction, and energy injection from newly-born magnetars. I will discuss the strengths and weaknesses of each of the these models and work in progress that addresses key issues by means of radiation hydrodynamics and radiation transfer physics.

# LSU Physics & Astronomy in the News

1. Professors Bill Hamilton and Warren Johnson, who had been conducting gravitational wave experiments using the first cryogenic bar detector in the basement of Nicholson Hall, approached LSU about bringing LIGO to Louisiana with the possibility - and eventual probability - of a detection. Hamilton said the need to develop the technology for a detector much larger and more sensitive than the cryogenic bar - which could detect tiny vibrations but had not found gravitational waves - provided some of the impetus for the development of the eventual 2½ - mile long LIGO interferometers. In addition, the location in the southeast US (2000 miles from a west coast detector and suitable to form one element of a triangle with an eventual European detector) and the low level of seismic activity gave significant advantages to a Louisiana location. [Read More](#)
2. Dr. González gave a special lecture at the 2016 AAAS Annual meeting on Feb.12. 2016. [At AAAS, LIGO's González Describes Massive Effort to Detect Tiny Waves](#)
3. LSU Physics Professor and LIGO Scientific Collaboration spokesperson Gabriela González was invited to testify before the U.S. Congress on the recent detection of gravitational waves, and the role of the LIGO Scientific Collaboration she leads. She and colleagues presented a full committee hearing titled "[Unlocking the Secrets of the Universe: Gravitational Waves to the Committee on Science, Space & Technology](#)" on Feb. 24.

## Special Event

### **“Observation of Gravitational Waves from a Binary Black Hole Merger”**

**3:30 PM Friday, March 11, 2016**

**130 Nicholson Hall**

**Gabriela González and Joseph Giaime**

The Laser Interferometer Gravitational- wave Observatory (LIGO) detectors in Livingston, Louisiana and Hanford, Washington, have observed gravitational waves from the inspiral and coalescence of a binary pair of black holes hundreds of millions of parsecs from the Earth. The signal carries with it information about this highly relativistic and dynamic astrophysical system. Our observation was made about a century after publication Albert Einstein's theory of general relativity and his prediction of such waves; and after half a century of work by several generations of experimentalists to measure the minuscule effects from the waves. At LSU, such an effort has spanned 45 years. After reviewing the basic properties of gravitational waves, we will present an overview of the detector design, give an overview of the various scientific results from the detection, and speak a bit about the field's future.