

Experimental General Relativity and Gravitational Wave Astronomy Honours Course 2009

Module 1: Introduction to Gravitational Astronomy

1. Experimental general relativity
[David Blair]
2. Gravitational waves in general relativity
[David Blair]
3. The gravitational wave spectrum
[David Blair]
4. Black hole systems
[David Blair]
5. Resonant mass and electromagnetic gravitational wave detectors
[David Blair]
6. Introduction to laser interferometer gravitational wave detectors
[Chunnong Zhao]

Module 2: The Physics and technology of Gravitational Wave detectors.

1. Introduction to laser interferometer gravitational wave detectors
[Chunnong Zhao]
2. Dual recycling interferometers
[Chunnong Zhao]
3. Control and operation of interferometer detectors
[Chunnong Zhao]
4. The physics of high optical power interferometers—3 mode opto-acoustic interactions
[Chunnong Zhao]
5. Optical cavity designs for interferometer detectors
[Pablo Barriga]
6. Quantum noise and technical noise: The enemy of sensitive experiments (Repeats in Module 3)
[Li Ju]
7. Seismic noise and vibration isolation systems for interferometer detectors
[Li Ju]
8. Thermal effects in laser interferometer detectors (optional for Module 2)
[Li Ju]

Module 3: Gravitational Wave Astronomy: Data analysis and Measurements Beyond the Quantum Limit

1. Introduction to laser interferometer gravitational wave detectors (from modules 1 or 2)
[Chunnong Zhao]
2. Gravitational wave data analysis
[Linqing Wen]
3. Networks of Gravitational wave detector
[Linqing Wen]
4. Measuring the signal at/beyond the Quantum limit (1)
[Yanbei Chen (Caltech)]
5. Measuring the signal at/beyond the Quantum limit (2)
[Yanbei Chen (Caltech)]

6. Measuring the signal at/beyond the Quantum limit (3)
[Yanbei Chen (Caltech)]

Week 2 (27-31, July)	Lectures 1-3 David (3)	
Week 3 (3-7, Aug.)	Lectures 4-6 David (2), Zhao (1)	
Week 4 (10-14, Aug)	Lectures 7-9 Zhao (3)	
Week 5 (17-21, Aug.)	Lectures 10-12 Pablo (1) Ju Li (2)	
Week 6 (24-28, Aug.)	Lectures 13-15 Ju Li (1) Linqing (2)	
Week 7 (31-4, Sept)	Non-teaching week	
Week 8 (14-18, Sept)	Lecture 16-18 Yanbie (3)	