

Schedule and Topics

October 2024

Day 1

Lecture 1. (11:00 - 12:30) Tatiane

Finding hope in the dark

- H_0 tension problem
- GW as distance indicators
- Einstein telescope and the future

Lecture 2. (14:00 - 15:30) Clara

Knowing the scenario:

- Physical Motivation for supersymmetry
- Lorentz and Poincare group
- Spinor Algebra

Lecture 3. (16:00 - 17:30) William

The Lens Galaxy in Theory

- Boltzmann Equation
- Jeans Equation
- Velocity Dispersion

Lecture 4. (18:30 - 20:00) Prajwal

Let's see the global picture

- Global aspects of spacetime (Black Hole theorems)
- Visualizing the big picture (Schwarzschild, Kerr: conformal picture)
- Local aspects (Kasner oscillations, BKL conjecture)gravity)

Day 2

Lecture 1. (11:00 - 12:30) William

The Lens Galaxy for Terrestrial Observers

- LOS Velocity Dispersion
- Galactic Model
- Einstein Angle computation

Lecture 2. (14:00 - 15:30) Tatiane

Having fun with statistics

- How to combine GW data with galaxy catalogs
- The likelihood function
- The challenges

Lecture 3. (16:00 - 17:30) Clara

Fermions need space...

- No-Go theorems
- Graded Algebra
- The supersymmetric extension of the Poincare algebra.

Lecture 4. (18:30 - 20:00) Prajwal

Lets throw some light

- Geodesics of massive and massless particles
- Shadow and other observables (role of geometry of accretion and inclination angle)
- Exact solutions in modified gravity

Day 3

Lecture 1. (11:00 - 12:30) Tatiane

Data Analysis

- Comprehensive study of CHIMERA
- Exploring the GLADE+ galaxy catalog
- Testing GW170817 as a dark siren

Lecture 2. (14:00 - 15:30) Clara

Beautiful Things

- $N = 1$ supersymmetry representations
- First field theoretical realization of the Super-Poincaré algebra: The Wess-Zumino Model

Lecture 3. (16:00 - 17:30) Prajwal

The collapse

- 3+1 formalism and junction conditions
- Spherical dust distribution collapse
- A peak into BH in higher dimensions

Lecture 4. (18:30 - 20:00) William

Bringing Together Lens and Galaxy

- Computation of LOS velocity dispersion entirely in terms of lensing observables accounting for atmospheric blurring.

Day	Time	Speaker	Lecture Topic and Details
DAY 1	11:00 - 12:30	Tatiane	Finding Hope in the Dark
			H_0 tension problem, GW as distance indicators, Einstein telescope and the future
	14:00 - 15:30	Clara	Knowing the scenario
			Physical Motivation for Supersymmetry, Lorentz and Poincare group, Spinor Algebra
	16:00 - 17:30	William	The Lens Galaxy in Theory
			Boltzmann Equation, Jeans Equation, Velocity Dispersion
	18:30 - 20:00	Prajwal	Let's See the 'Big' Picture
		Global aspects of spacetime (Black Hole theorems), Visualizing the big picture (Schwarzschild, Kerr: conformal picture), Local aspects (Kasner oscillations, BKL conjecture)	
DAY 2	11:00 - 12:30	William	The Lens Galaxy for Terrestrial Observers
			LOS Velocity Dispersion, Galactic Model, Einstein Angle computation
	14:00 - 15:30	Tatiane	Having Fun with Statistics
			How to combine GW data with galaxy catalogs, The likelihood function, The challenges
	16:00 - 17:30	Clara	Fermions need space...
			No-Go theorems, Graded Algebra, The supersymmetric extension of the Poincare algebra.
	18:30 - 20:00	Prajwal	Let's Throw Some Light
		Geodesics of massive and massless particles, Shadow and other observables, Exact solutions in modified gravity	
DAY 3	11:00 - 12:30	Tatiane	Data Analysis
			Comprehensive study of CHIMERA, Exploring the GLADE+ galaxy catalog, Testing GW170817 as a dark siren
	14:00 - 15:30	Clara	Beautiful Things
			$N = 1$ supersymmetry representations, First field theoretical realization of the Super-Poincaré algebra: The Wess-Zumino Model
	16:00 - 17:30	Prajwal	The Collapse
			3+1 formalism and junction conditions, Spherical dust shell collapse
	18:30 - 20:00	William	Bringing Together Lens and Galaxy
		Computation of LOS velocity dispersion in terms of lensing observables accounting for atmospheric blurring	

Table 1: Timetable for Minicourses