Introduction
A5 sub-course 一般物理学理論

Kipp Cannon
（RESCEU）

物理学専攻入試ガイダンス 2025年5月31日

Theoretical Astrophysics & Cosmology

Early Universe　　Star formation・Observational Cosmology

Method

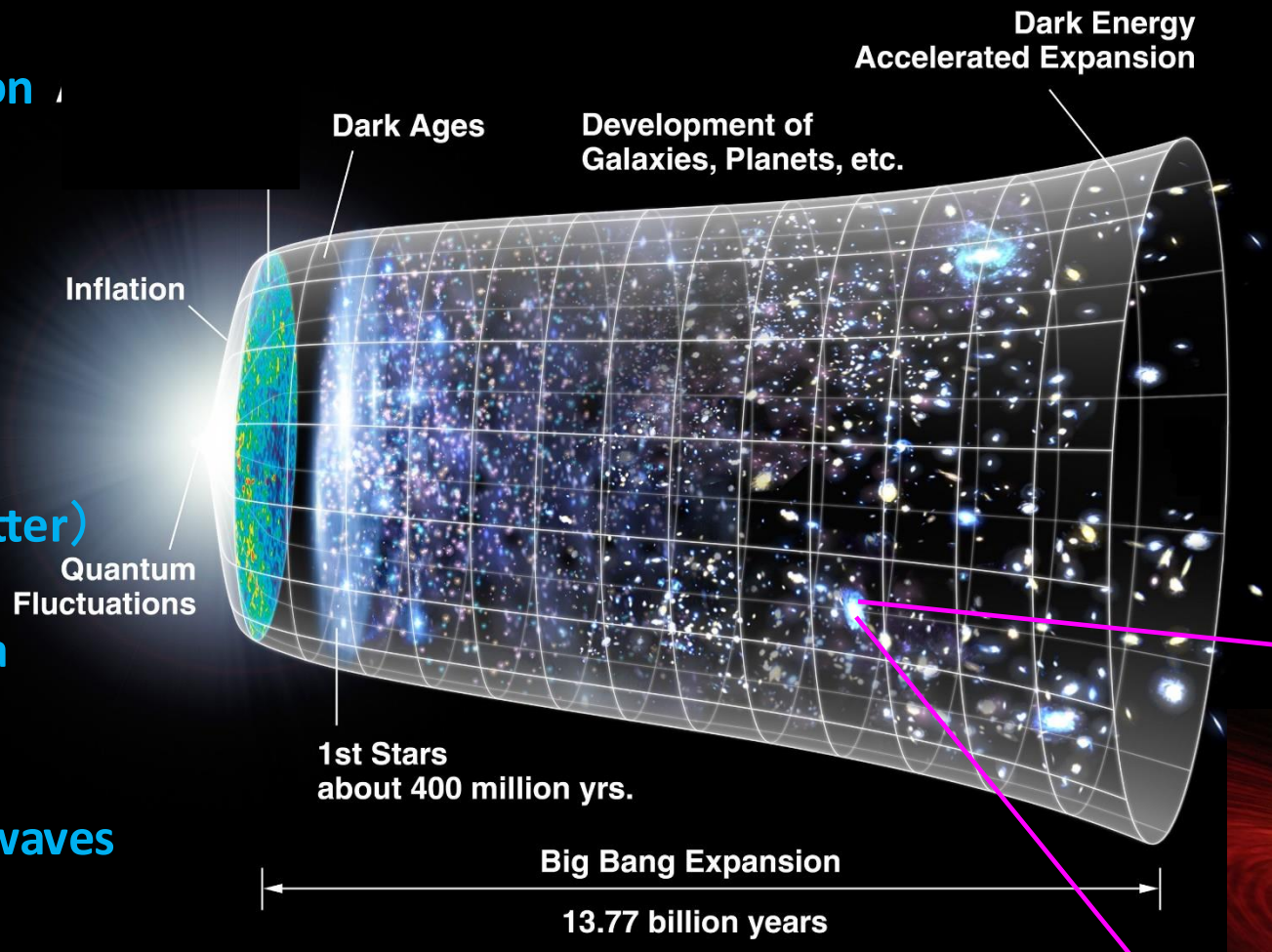
- Theory
- Numerical Simulation
- Data Science

Targets

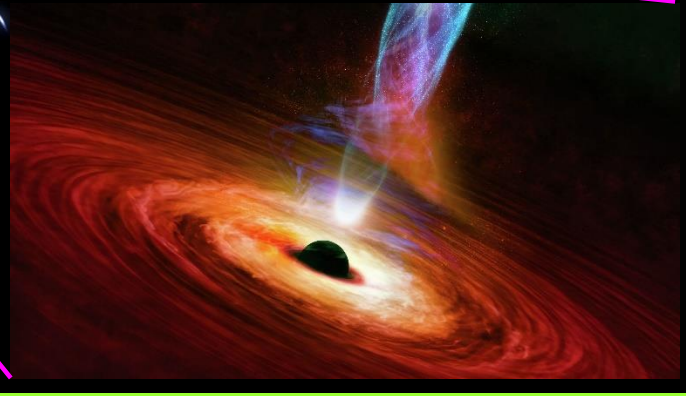
- Quantum field
- Space time
- Fluid
- N-body（Dark Matter）
- Plasma
- Observational Data

Observation

- Electromangentic waves
- Cosmic rays
- Neutrions
- Gravitational waves



High-Energy
Astrophysics



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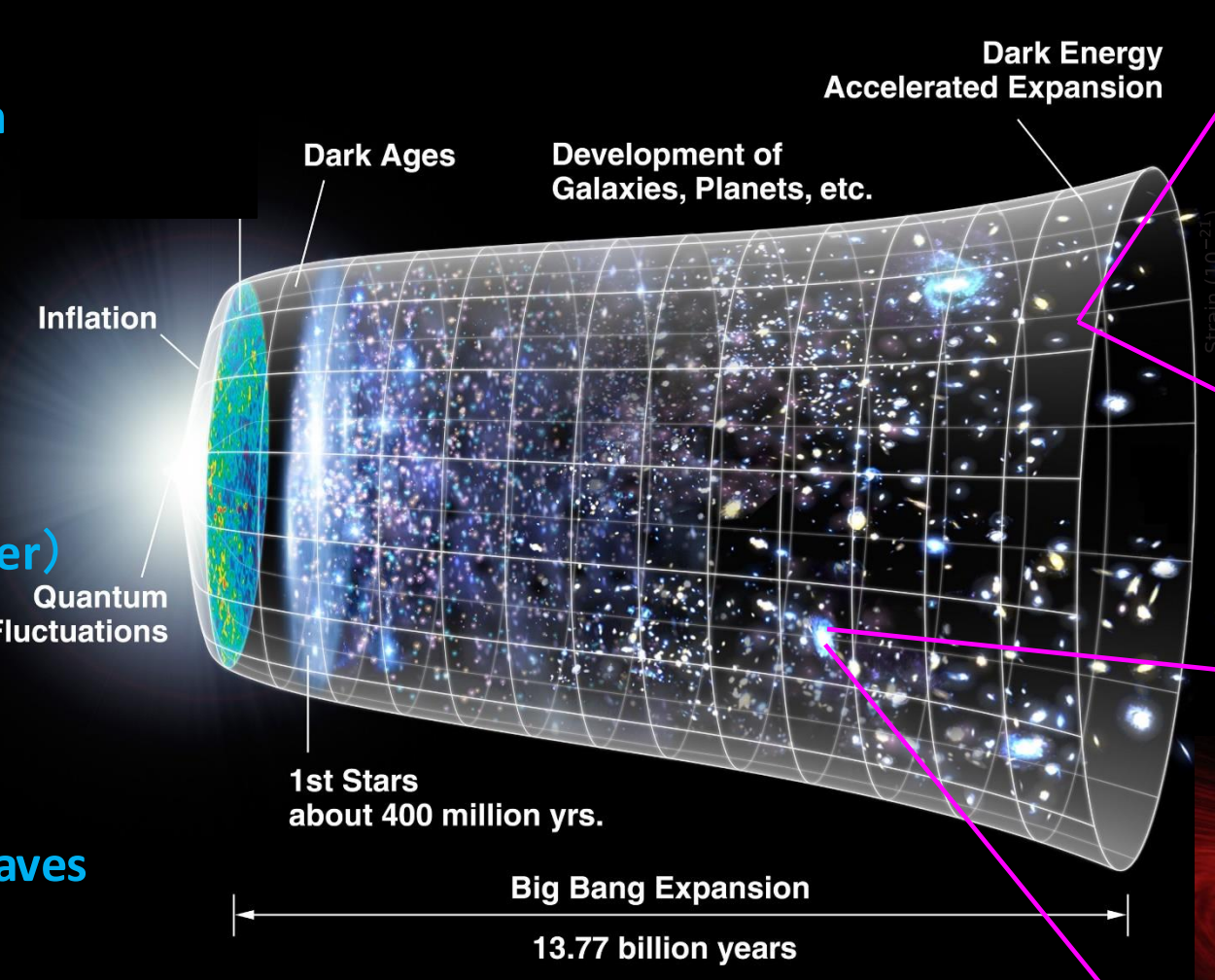
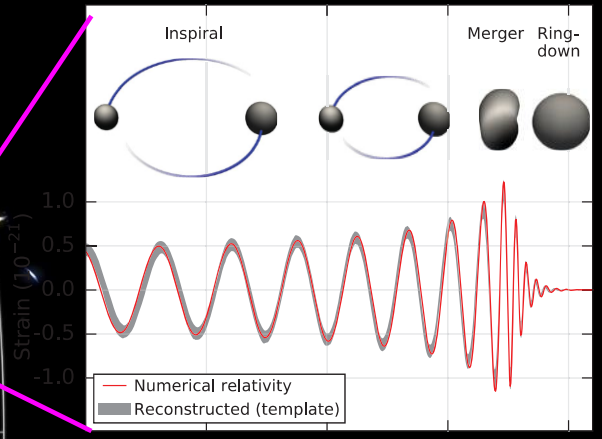
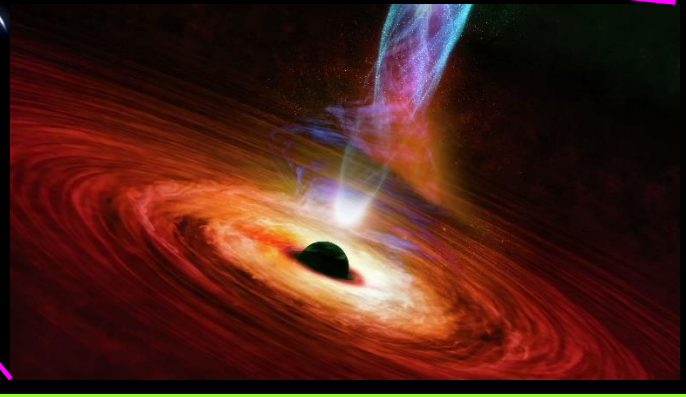




Gravitational-wave mergers

High-Energy Astrophysics



Multi-messenger Astronomy!!

Theoretical Astrophysics & Cosmology

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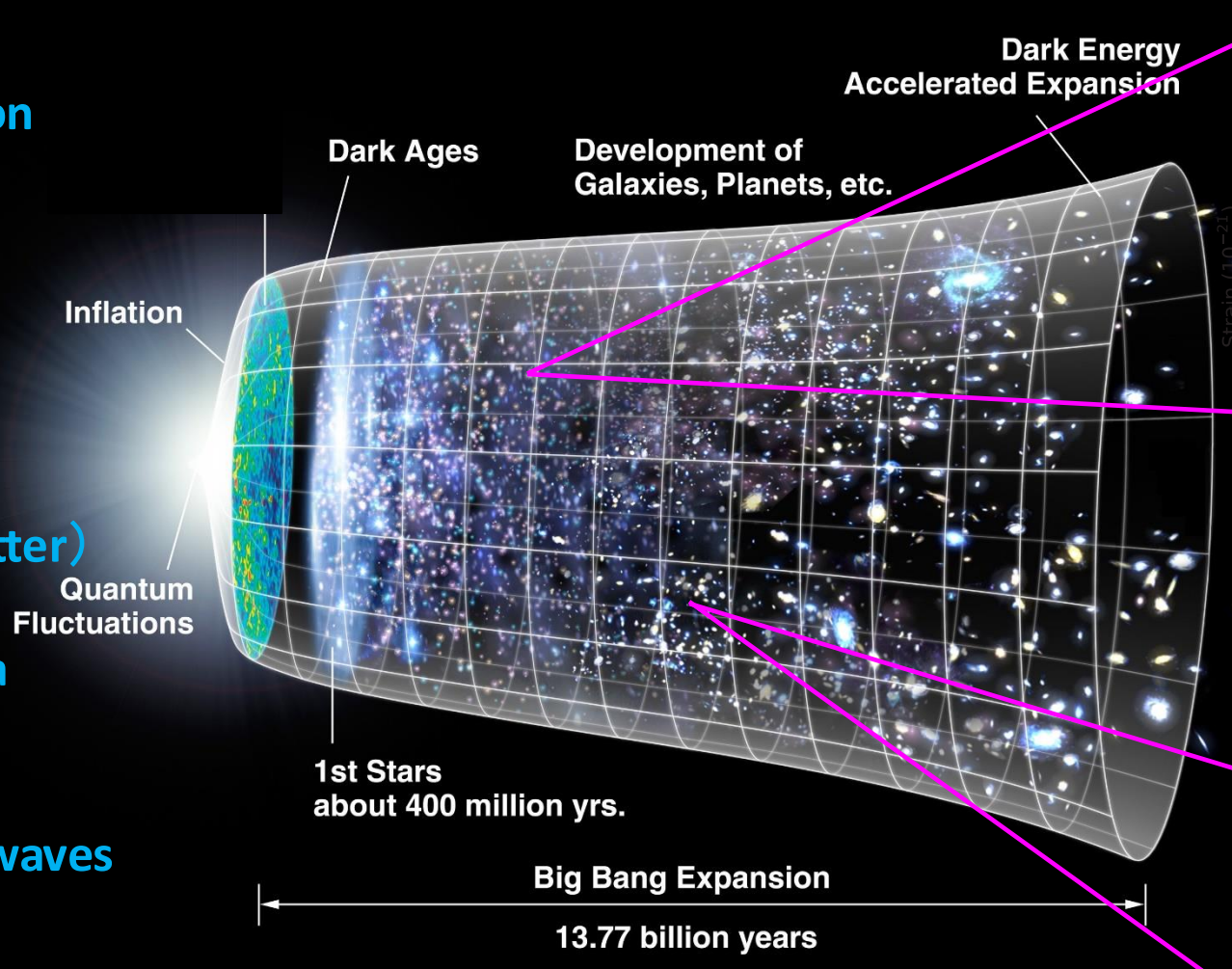
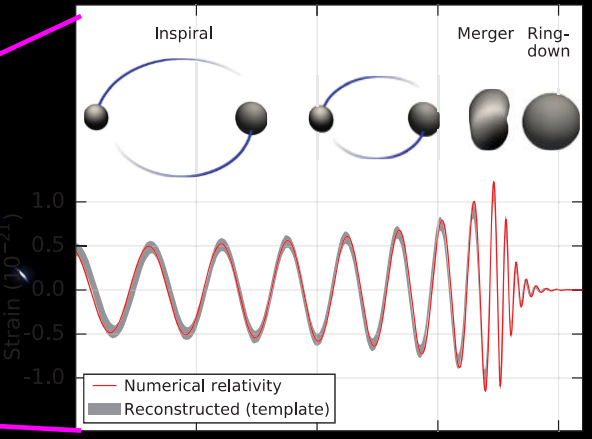




Gravitational-wave mergers

Supermassive BHs
LISA

Multi-messenger Astronomy!!

Faculty members of A5 sub-course

	名前	所属	専門分野	備考
本郷 (Hongo)	Naoki Yoshida	Physics	Star formation and evolution	
	Kipp CANNON	RESCEU	GW data analysis	
	Kenta Hotokezaka	RESCEU	Relativistic astrophysics	
柏 (Kashiwa)	Katsuaki Asano	ICRR	High-energy astrophysics	
	Masahiro Takada	IPMU	Observational cosmology	
	Hideyuki Tagoshi	ICRR	GW data analysis	

Research Topics of A5 sub-course

Theory・Simulation
Data Science

High-Energy Astrophysics

Hotokezaka

Compact objects、Binary mergers、GW、
Kilonova and transients、Nucleosynthesis、
Numerical relativity, hydro simulations

Asano

High-energy astrophysics、γ-ray bursts、
Relativistic jets、Cosmic rays、
High-energy neutrinos、Plasma

Observational Cosmology・Star formation

Yoshida

Galaxy and star formation、Chemical evolution、
Planet formation、BH formation、
Cosmological simulations、Machine learning

Takada

Observational Cosmology、Tests of cosmology、
Dark matter、Dark energy、Neutrino models
Data analysis（Subaru、LSST）

GW data analysis

Cannon

GW data analysis、Origin of binaries、
Origin of black holes

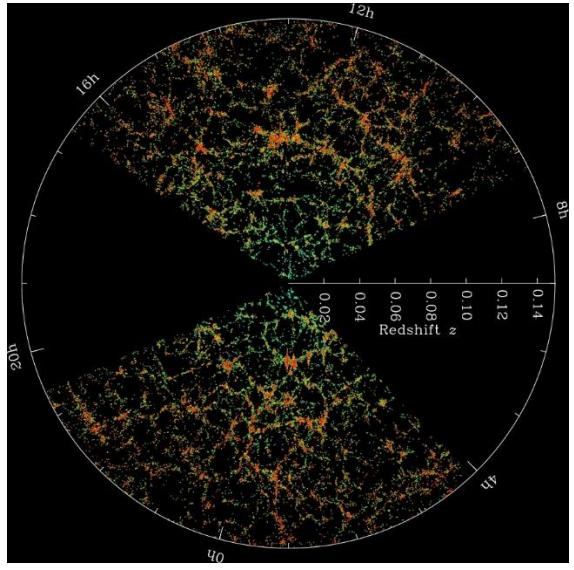
Tagoshi

GW data analysis、KAGRA、
Waveform modeling、GW astronomy

Observational Cosmology · Star Formation

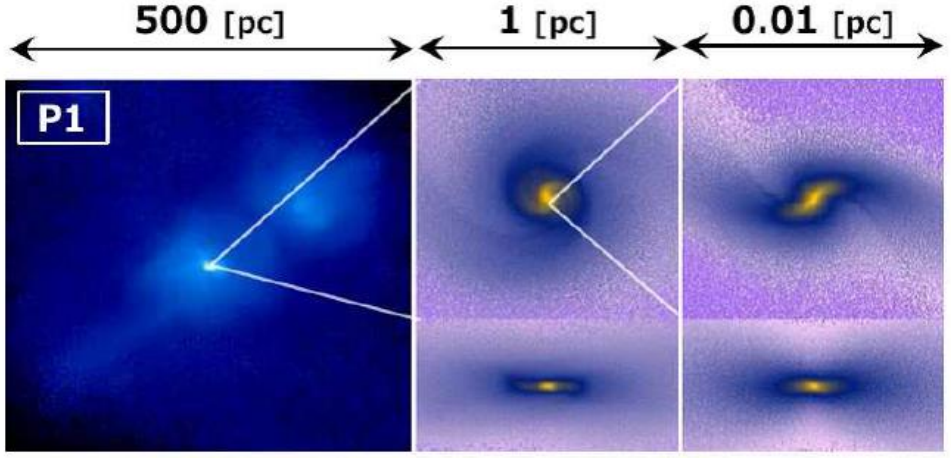
Observational Cosmology

- Large Scale Structure
- Galaxy Clusters
- Star & Galaxy formation history
- Cosmic reionization



Star Formation

- Thermal evolution of gas
- Star formation
- Planet formation
- Binary evolution
- Supermassive BH formation



JWST has been getting excellent data.

Subaru PFS is operating. LSST is coming soon.

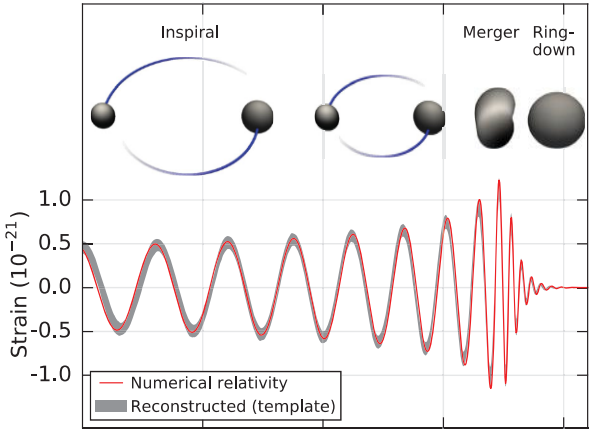
High-Energy Astrophysics ・ Gravitational Waves

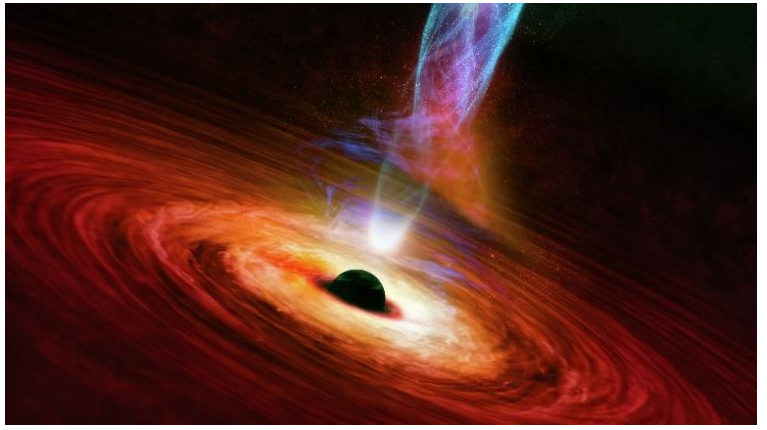
Macrophysics

- Supernova
- Gamma-ray burst
- Relativistic jet
- Neutron star
- Black hole
- Binary merger (GW)

Microphysics & Radiation

- Plasma processes
- Particle acceleration （shock, turbulence）
- Γ-ray ・ X-ray ・ radio
- Cosmic ray （～10^{20}eV）
- Neutrino
- Neucleosynthesis





Multi-messenger observations: LIGO/Virgo/KAGRA O4 Run, Next-generation of GW detectors, IceCube etc.

Guidance

13:30-15:30

Kashiwa

ICRR（Asano, Tagoshi）
対面 1号館207講義室
オンラインもあり

IPMU（Takada）
オンライン

15:30-17:30

Hongo

吉田直紀	対面とオンライン	理学部1号館9階 908号室	5/31（土）15:30-16:30 に対面で実施 5/31（土）16:30-17:30 にオンラインで実施
Kipp Cannon	オンライン		Online from 15:30 to 17:30 on the day of the event.
仏坂健太	対面	理学部4号館1階 1116号室	6月2日 13時～14時