

Lecture 0: Guidance of Lecture

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Spacial lecture “GRMHD”, August 13th-17th, USP-IAG, Sao Paulo, Brazil

Brief Introduction of myself

- Name: Yosuke Mizuno
- Nationality: Japanese
- Graduated: Kyoto University at 2004
- Worked as PostDoc/ Research Scientist in NASA Marshall Space Flight Center, Univ. of Alabama in Huntsville, National Tsing-Hua Univ.
- Current position: Inst. for Theoretical Physics, Goethe Univ. Frankfurt (BHCam project research scientist)
- Research Interests: Plasma Astrophysics, Relativistic Astrophysics, Numerical Astrophysics, High-energy Astrophysics

Lecture Website

Lecture Website

https://itp.uni-frankfurt.de/~mizuno/grmhd_2018.html

No specific text book for this lecture

Upload lecture note of each chapter (keynote presentation file or pdf) on this website later

Course Contents

- Brief Introduction of Relativistic Astrophysics (Mon)
- Overview of Newtonian Hydrodynamics and Magnetohydrodynamics (Mon)
- *[Seminar] Testing Theories of Gravity via Black Hole Shadows (Tue)*
- Numerical Methods for Solving MHD (Tue)
- Essence of Special and General Relativity (Wed)
- 3+1 Forms of General Relativistic MHD Equations (Thu)
- Application of General Relativistic MHD (Fri)

Recommended Text

- Anile, 1990, Relativistic Fluids and Magneto-fluids, Cambridge
- Andersson & Comer 2007, Relativistic Fluid Dynamics: Physics for Many Different Scales, Living Reviews in Relativity
- Font 2008, Numerical Hydrodynamics and Magnetohydrodynamics in General Relativity, Living Reviews in Relativity
- Rezzolla & Zanotti 2013, Relativistic Hydrodynamics, Oxford

Notice

- Units:
 - Mixed SI (MKSA) and cgs
 - Several Equations are written in SI unit
 - In Astrophysics, cgs unit is popular
- Derivation of Equations:
 - I try to show most of derivation
 - But