

COURSE DESCRIPTION

Course Name	Seminar Gravitational Waves
Course Type	research seminar (sd)
Supervisor	Andrzej Królak
ECTS credit allocation	1 – IM PAN Ph. D. program; 3 recommended for MA programs
Duration	Two semesters
Number of hours	30
Language	English or Polish, if every participant speaks Polish
Prerequisites	General relativity. Mathematical statistics.
Course content	Modeling of gravitational wave signals. Detection of gravitational wave signals in the noise of a detector and parameter estimation. Gravitational wave data analysis. Numerical solutions of Einstein's equations. Modeling of sources of gravitational waves. Approximate solution of two-body problem in Einstein's equations.
Recommended reading	<ol style="list-style-type: none"> 1. B. F. Schutz, A First Course in Relativity, Cambridge University Press, 2009. 2. P. Jaranowski i A. Królak, Analysis of gravitational-wave data, Cambridge University Press, 2009. 3. R.N. McDonough and A.D. Whalen, Detection of Signals in Noise, Academic Press, 1995.
Learning outcomes	<ol style="list-style-type: none"> 1. Participant is familiar with principles of statistical hypothesis testing and basic methods of parameter estimation including maximum likelihood method and Bayesian approach. 2. Knows basic models of gravitational wave signals. 3. Knows basics of time series analysis. 4. Is able to find literature concerning the problems discussed at the seminar and is able to understand it. 5. Is able to discuss with other seminar participants problems presented at the seminar and is able to collaborate with other seminar members.
Assessment methods and criteria	Seminars presented, presence and active participation in the seminar.
Remarks	