



MASTER DEGREE

MATHEMATICS FOR PHYSICS

Math4Phys

Math4Phys Master Degree Presentation

The Math4Phys master at the EIPHI graduate School addresses the recent progress in several fields of mathematical physics related to high-energy physics, astrophysics, quantum and nonlinear optics as well as condensed matter physics.

Numerous very sophisticated mathematical tools are introduced to analyze complex physical systems such as cold atom gases and black holes.

Specialists with a double competence in different fields of modern Mathematics and Physics address these problems using an original interdisciplinary approach.

The Math4Phys master is coordinated by the IMB laboratory.

PROGRAM (Dijon Campus)

Y E A R 1	Core Courses with Research Project 24 ECTS		Crossdisciplinary Courses 6 ECTS
	Core Courses with Research Project 18 ECTS	Soft Skills Courses 6 ECTS	Crossdisciplinary Courses 6 ECTS
Y E A R 2	Specialized Courses with Research Project 24 ECTS		Soft Skills Courses 6 ECTS
	Research Internship 30 ECTS		

Core Course List: 42 ECTS

DIFFERENTIAL GEOMETRY ORDINARY DIFFERENTIAL EQUATIONS GROUPS & REPRESENTATIONS RESEARCH PROJECT	FOURIER ANALYSIS PARTIAL DIFFERENTIAL EQUATIONS MATHEMATICAL METHODS OF CLASSICAL MECHANICS
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Cross-disciplinary Course List: 12 ECTS

QUANTUM PHYSICS
MATHEMATICAL METHODS OF GRAVITATION
MATHEMATICAL METHODS OF QUANTUM PHYSICS...

Specialized Course List: 24 ECTS

POISSON LIE GROUPS & LIE ALGEBRAS
QUANTUM GROUPS
RIEMANNIAN GEOMETRY & INTEGRABLE SYSTEMS
ADVANCED RESEARCH PROJECT

Soft Skills Course List: 12 ECTS

FOREIGN LANGUAGE
NUMERICAL METHODS
TRANSVERSAL SKILLS...





RESEARCH

**GEOMETRY & DYNAMIC SYSTEMS,
MATHEMATICAL PHYSICS,
STATISTICS PROBABILITY OPTIMIZATION & CONTROL**

7 Research Laboratory

3 Research Teams

Mathematical Physics



**INSTITUT DE MATHÉMATIQUES
DE BOURGOGNE**

Statistics, Probability, Optimization & Control

Geometry & Dynamic Systems

Research Domains :

Algebraic Geometry and Complex Geometry
Control Theory
Deformation quantization
Differential Equations and Diffeomorphisms
Dynamical Systems
Geometric Group Theory and Low-Dimensional Topology

General Relativity
Integrable Systems
Malliavin Calculus, Stochastic Differential Equations, Mathematical Physics
Nonlinear Analysis
Numerical Analysis, Partial Differential Equations

Optimization, Inverse problems, Signal and Image processing, Optimal Transport
Poisson Groups, Representation Theory & Hopf Algebras, Probability
Spectral Analysis
Stochastic Algorithms, Functional Data Analysis, Applied Statistics

