Theory Group in 1964
Theory Group
Theory Group

Academic Staff (15)
- Dan Waldram (HoG)
- Carlo Contaldi
- Fay Dowker
- Tim Evans
- Jerome Gauntlett
- Jonathan Halliwell (MSc Adm)
- Amihay Hanany
- Chris Hull FRS
- Joao Magueijo
- Arttu Rajantie
- Claudia de Rham
- Kellogg Stelle (MSc dir)
- Andrew Tolley (PhD adm)
- Arkady Tseytlin
- Toby Wiseman

Emeritus Staff (4)
- Mike Duff FRS
- Chris Isham
- Ray Rivers
- Hugh Jones

Postdoctoral Researchers (12)

Visiting Researchers (4)

PhD students (30)

MSc students (50)
MSc in Quantum Fields and Fundamental Forces

- Preparation for PhD studies in fundamental theoretical physics:
  - Theory, techniques, applications
  - Graduate-level lectures (attended also by PhD students)
  - Research skills: Dissertation project

- Full MSc course under Bologna system:
  - 12 months full time / 24 months part time
  - 90 ECTS credits
Quantum Field Theory
String Theory

Today's Lesson: $W_0$ or "Witten's Dog"

Neutron Encrusted Steaming Hot Dark Matter

$\Omega_Y = \frac{m_Y}{93eV} \cdot \frac{\langle W_0 W_0 \rangle}{(2+1)^4}$

SuperDuperSymmetric String Theory
Lecture Courses

- Compulsory
  - Particle Symmetries
  - Quantum Field Theory
  - Quantum Electrodynamics
  - Unification – the Standard Model

- Optional (4, at most 2 UG)
  - Advanced QFT
  - Black Holes
  - Differential Geometry
  - Particle Cosmology
  - String Theory
  - Supersymmetry
  - The Standard Model and Beyond
  - Foundations of QM (UG)
  - General Relativity (UG)
  - Group Theory (UG)
  - Quantum Information (UG)
  - Quantum Theory of Matter (UG)
Timetable

- Dissertation
- Compulsory Courses + Some Options
- Christmas Break
- New Year Tests
- Optional Courses
- Easter Break
- Exams
- Special Topics Lectures
Seminars and Special Topics Lectures

- Departmental Colloquium
- Theory Group Seminar
  (+ Several specialised seminar series)
- Special Topics Lectures in June
  - Recent examples:
    - Asymptotics
    - Effective Field Theories for Cosmology
    - Introduction to AdS/CFT
    - Localisation and Matrix Models
    - Supergravity and Flux Compactifications
    - Twistor Theory
Dissertations

- From June to September
- Supervised by a faculty member
  - Usually related to their own research
- You decide the topic with your supervisor:
  - No fixed list of topics
Examples of Dissertation Topics

- A Numerical Study of the Quantum Backflow Effect
- A review of the AdS/CFT Duality
- Bimetric Models of Gravity and Cosmology in the Early Universe
- Born-Infeld Action and Its Applications
- Causal Sets from Classical Sequential Growth Models
- Collapse Theory
- Confinement and the String Tension in Hot Yang Mills
- Cyclic Universe: Cosmic Evolution and Perturbations Analysis
- Effective Field Theories for Inflation
- Generalized Geometry, Parallelizability and Non Geometry
- Higher Derivative Theories of Gravity
- Octonionic Aspects of Supergravity Spin systems on causal sets
- The Black Hole Firewall Paradox
- The Causal Set Approach to Quantum Gravity
- The Phoenix Universe
- Theoretical Studies of Magnetic Monopole
- Time in Quantum Mechanics
- Weak Measurements
Entry Requirements

- 1st class BSc or MSci in Physics (or Maths)
  - Lagrangian and Hamiltonian mechanics
  - Quantum mechanics, Dirac notation
  - Special relativity, tensors
  - Electrodynamics

- Language Test
  - Needed for registration, not application!
  - See website for details
Fees and Funding

- Tuition fee:
  - See college website

- Government loan scheme:
  - Home/EU students without a Masters degree

- Scholarships:
  - Scholarship Search Tool on the College website
  - Support from home country
Applications

- Online application system:
  - See link on the course website: [http://www.imperial.ac.uk/theoreticalphysics/msc](http://www.imperial.ac.uk/theoreticalphysics/msc)
  - CV, personal statement, transcript of UG degree, two references

- Timescale:
  - Applications are processed as they arrive
  - Deadline end of July, but don’t leave it so late!
  - Outcome usually within 6 weeks

- Remarks:
  - Enter courses in order of preference
  - College only makes one offer
More Details

• Website: http://www.imperial.ac.uk/theoreticalphysics/msc

• Email: j.halliwell@imperial.ac.uk (academic) or l.sanchez@imperial.ac.uk (administrative)