

Imperial College
London

Theoretical Physics Postgraduate Open Day

7 December 2022

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

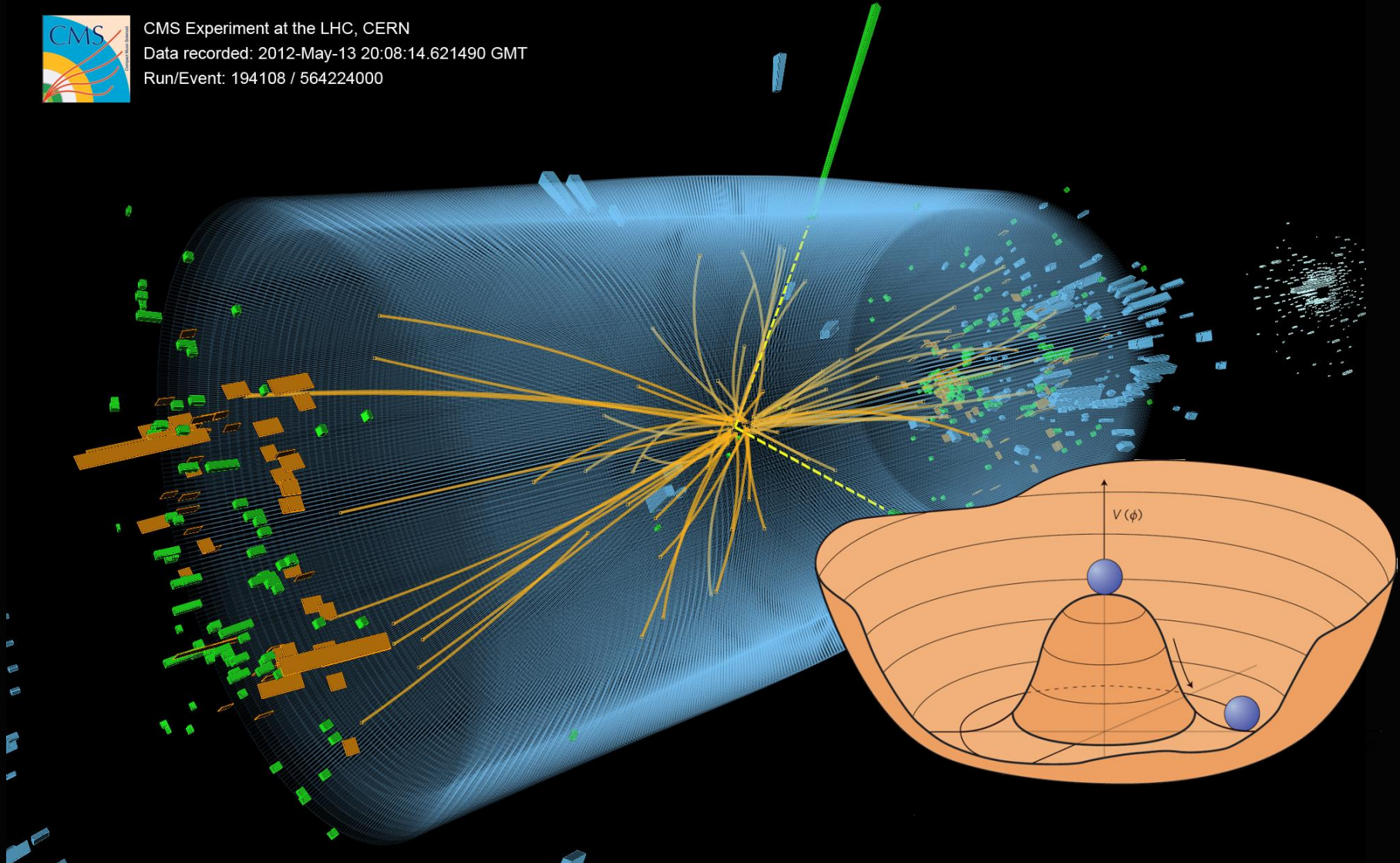
Quantum Fields and Fundamental Forces

- ▶ 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

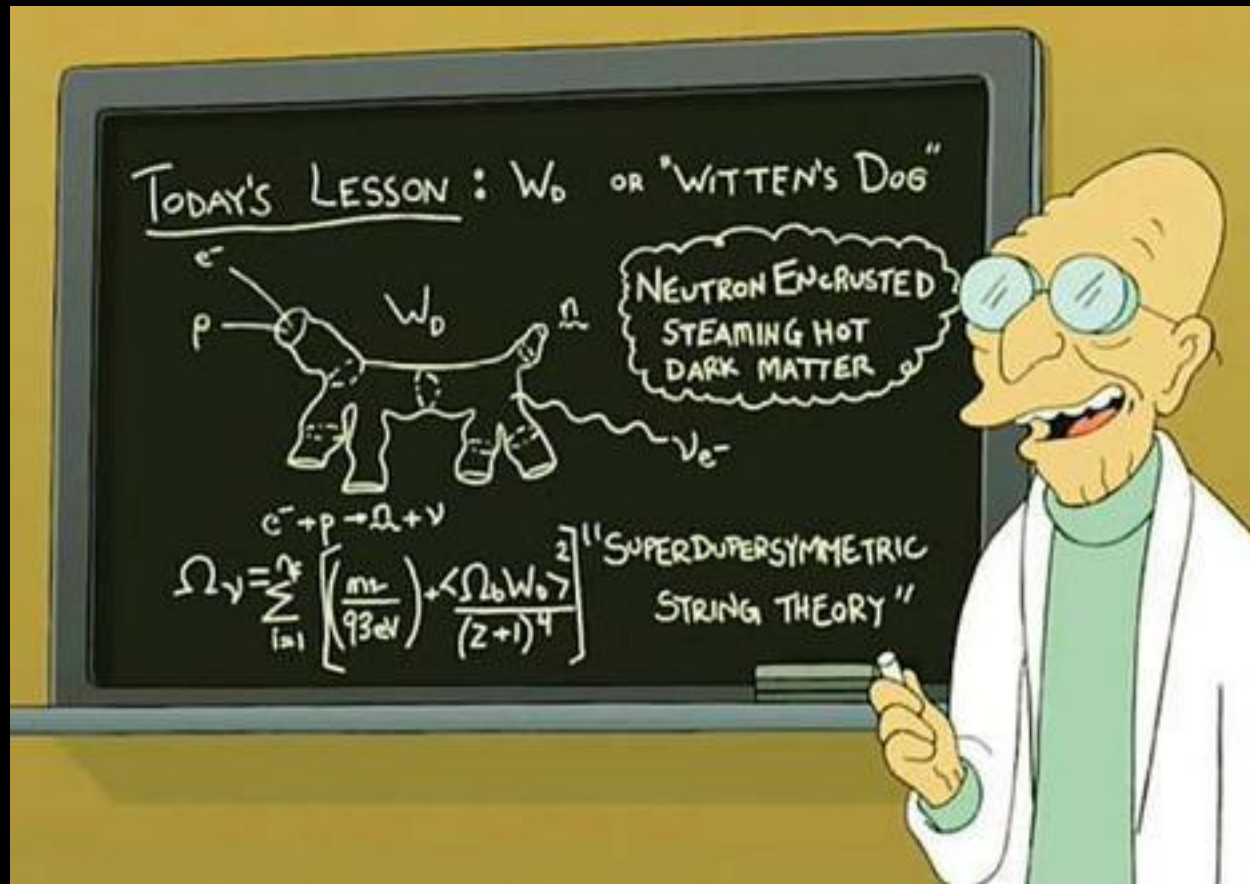
Quantum Field Theory



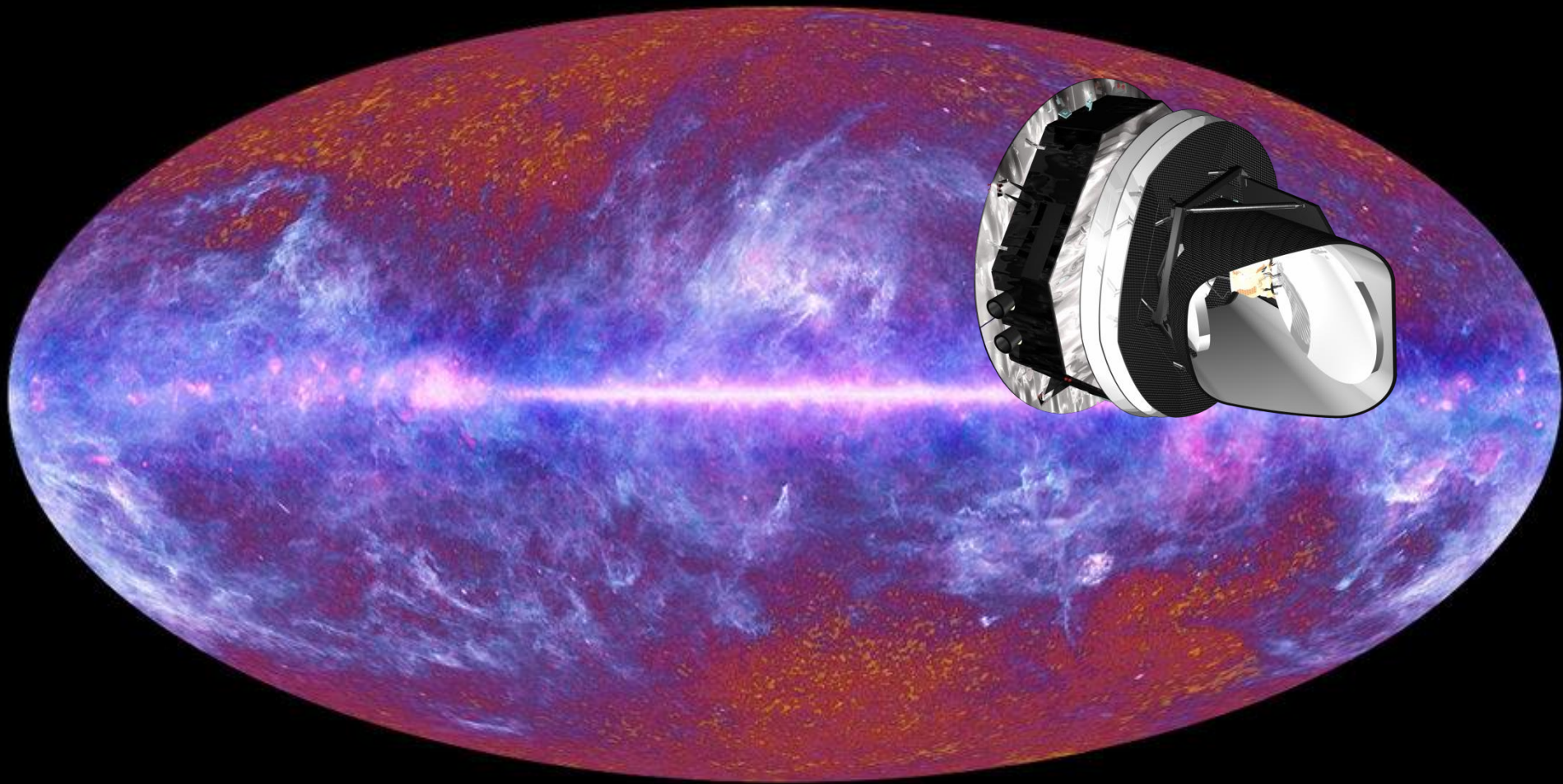
CMS Experiment at the LHC, CERN
Data recorded: 2012-May-13 20:08:14.621490 GMT
Run/Event: 194108 / 564224000



String Theory



Cosmology and General Relativity



Quantum Mechanics



Lecture Courses

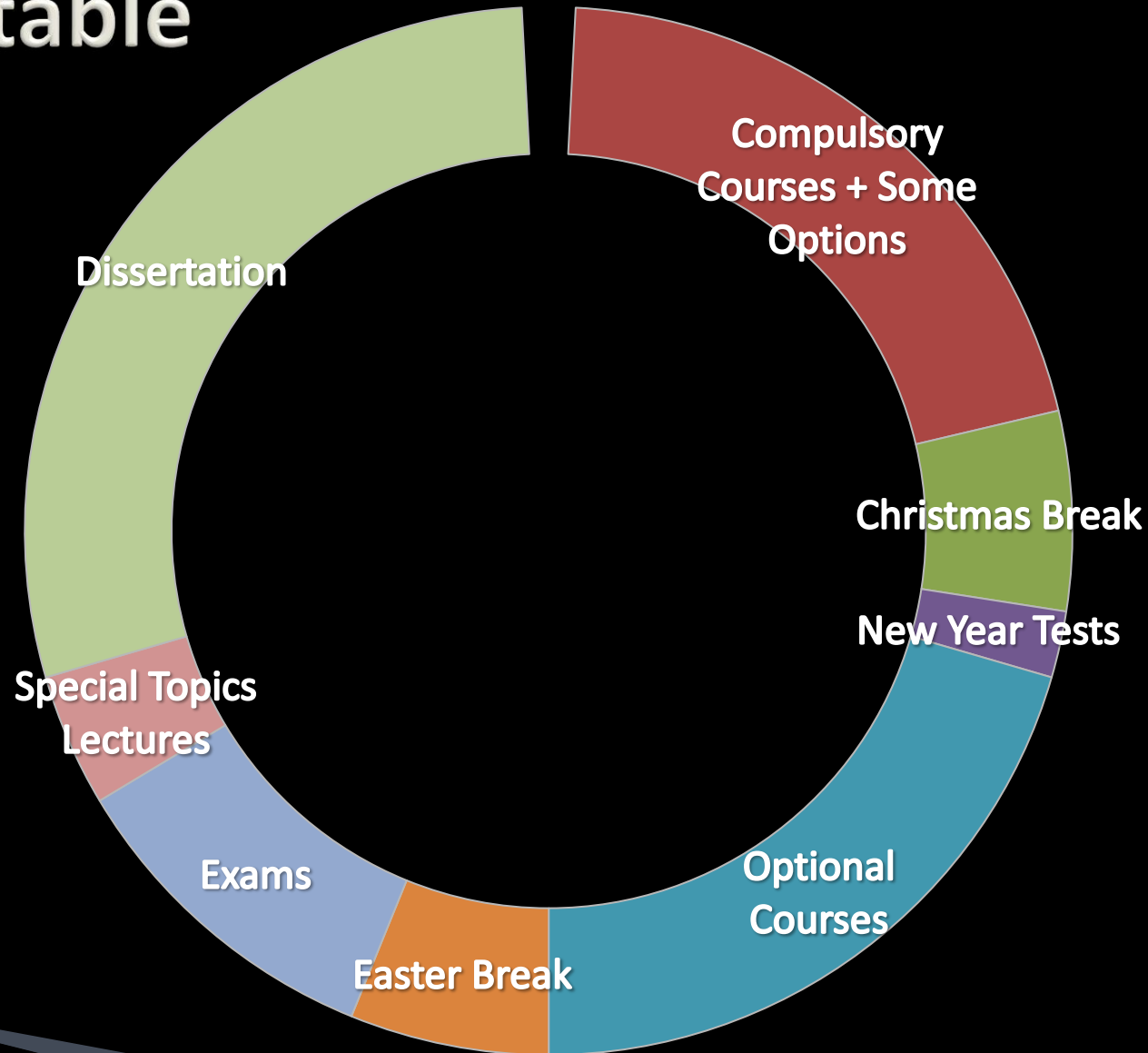
▶ Compulsory

- 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



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>
 - 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)