

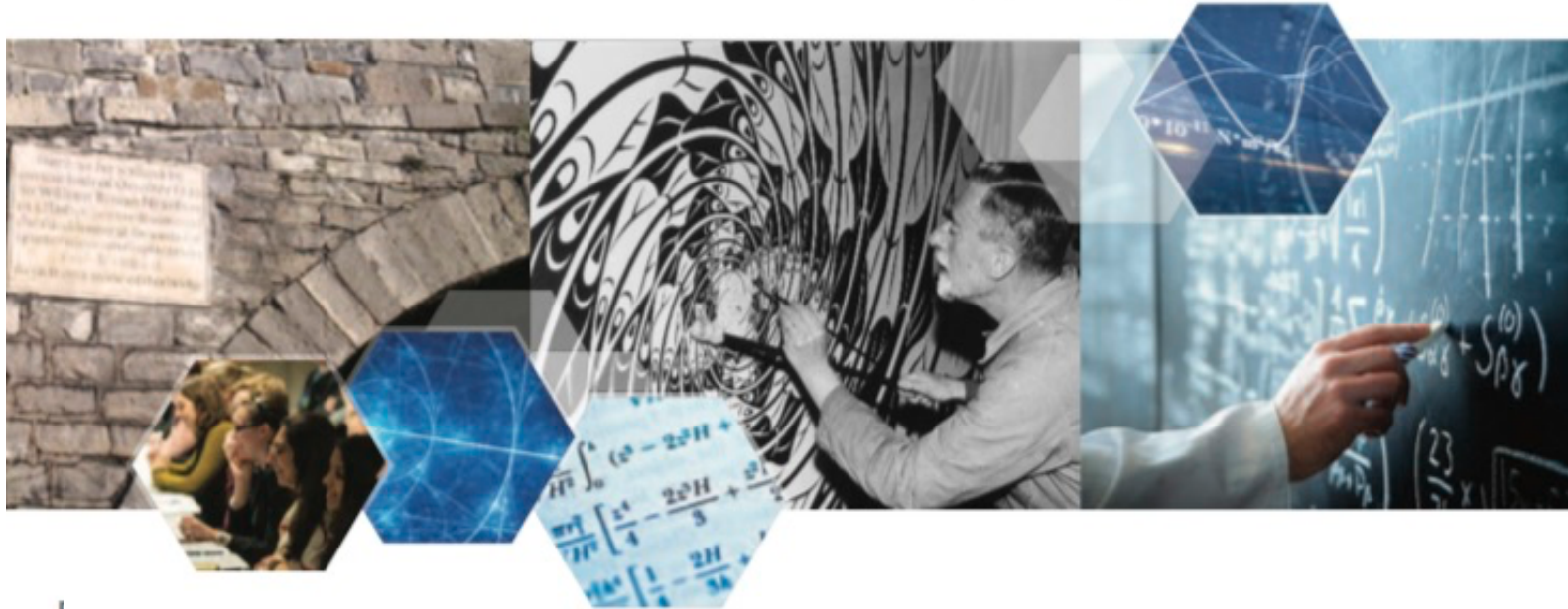


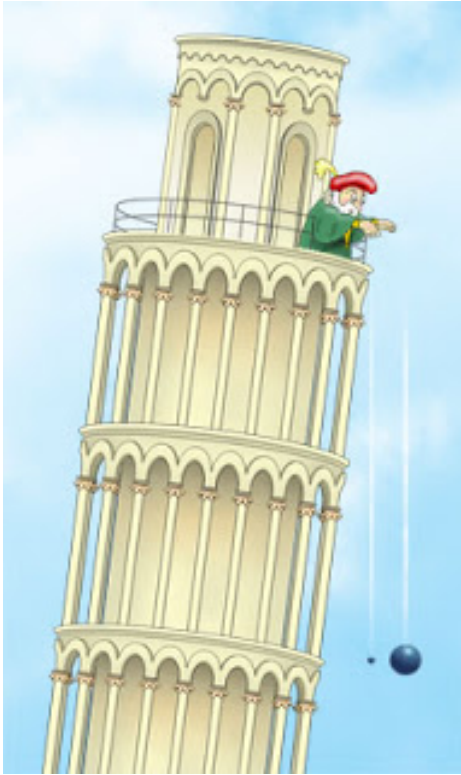
Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Theoretical Physics (TR035)

Jan Manschot
Course Coordinator for TR035

Welcome to Theoretical Physics at TCD!



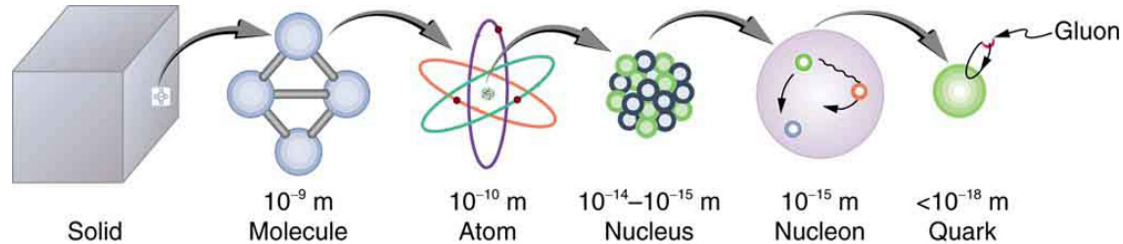


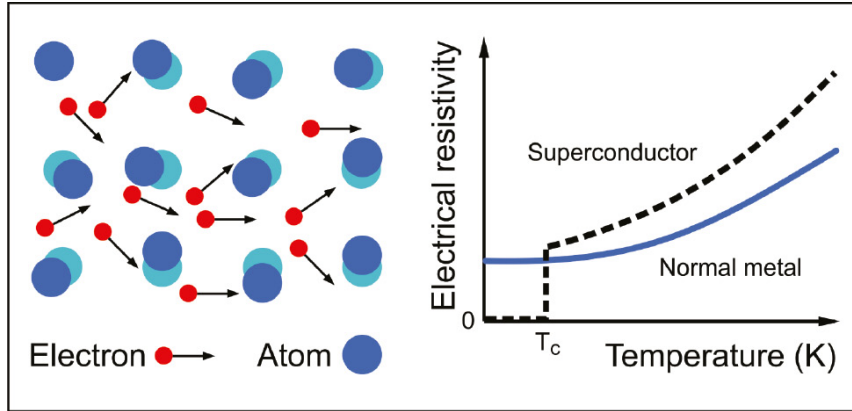
Galileo Galilei, approx 1592

The speed of falling objects can be determined using *Conservation of Energy*.

Would you also like to know:
Why is energy conserved?

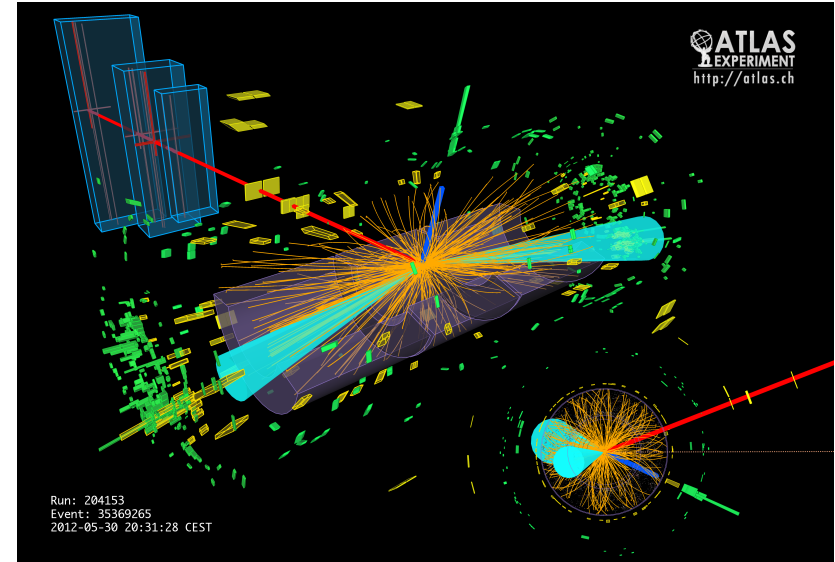
Solids consist of molecules, which consist of atoms, which consist of





Zeitschrift für Naturforschung B 75, 1-2

Would you like to understand the exotic phenomena, such as superconductivity?



Would you like to understand the structure of *the tiniest constituents of Nature*?

Newton's Universal Law of Gravitation describes planetary motion.



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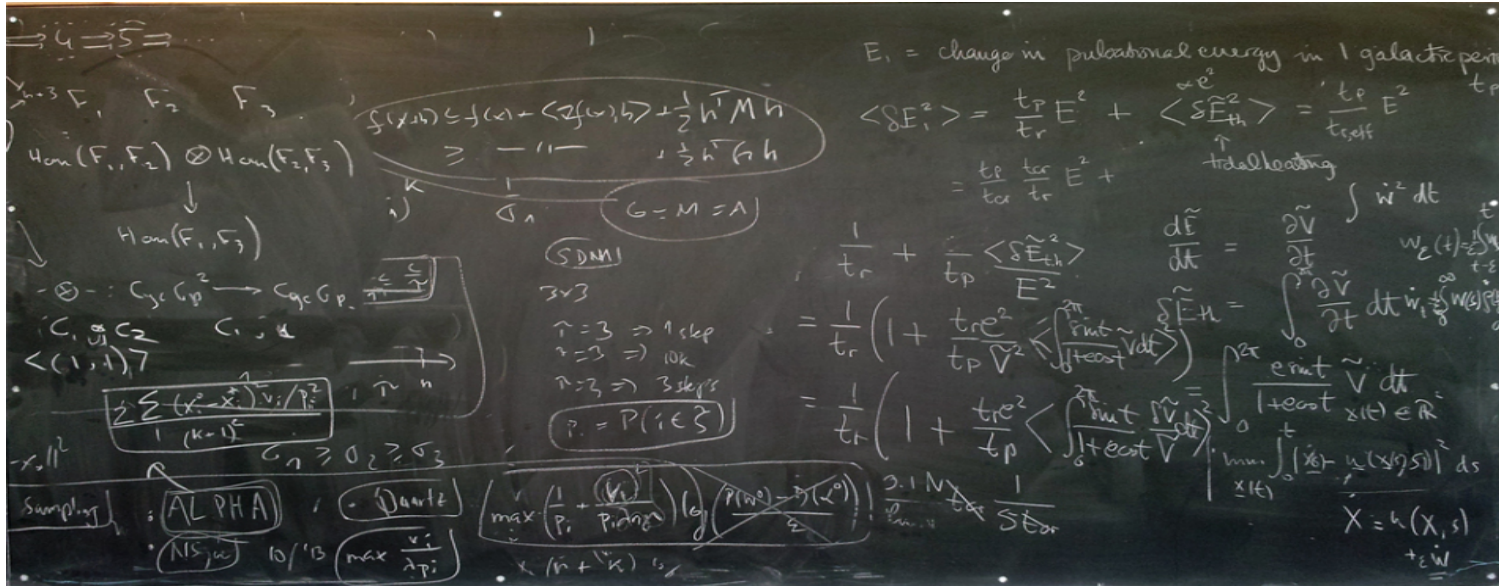
Event Horizon Telescope collaboration

Would you be interested to understand the dynamics of *black holes*?

For example: Three solar masses within $\pm 3\text{km}$.

If yes, Theoretical Physics might be the right course for you!

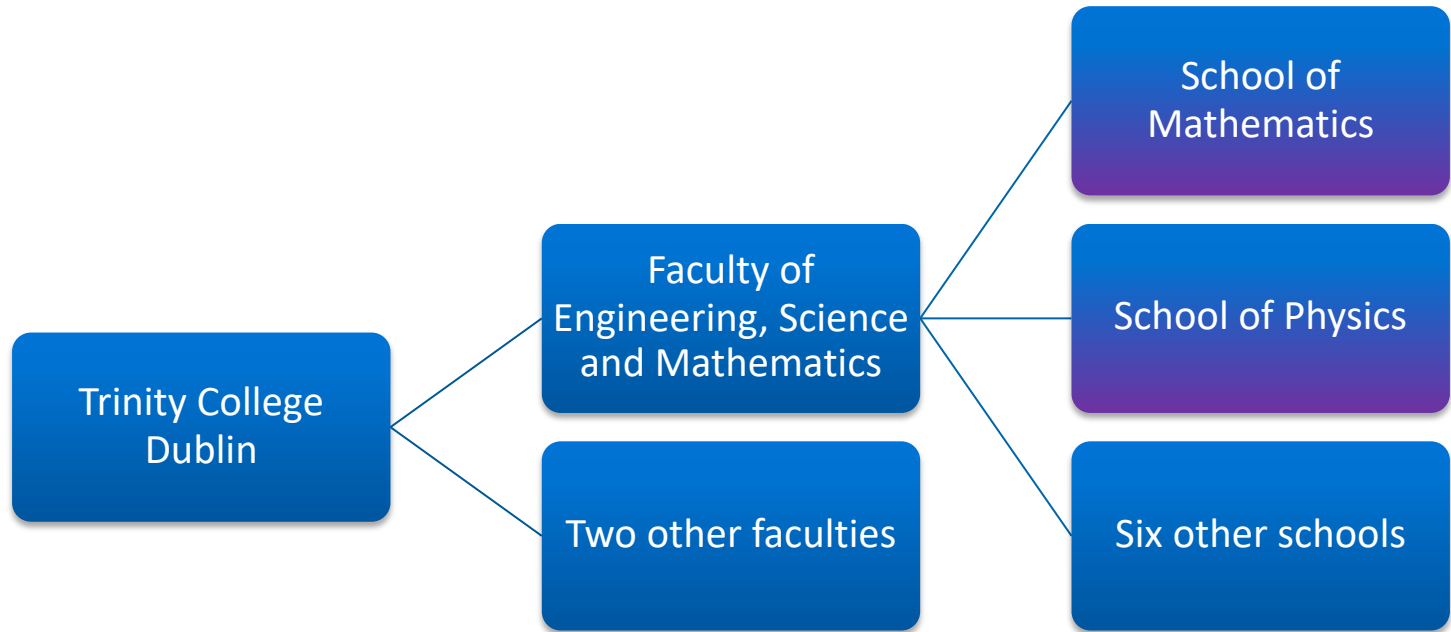
We describe fundamental physical phenomena using mathematics.



Edinburgh Common Room

Theoretical Physics at TCD

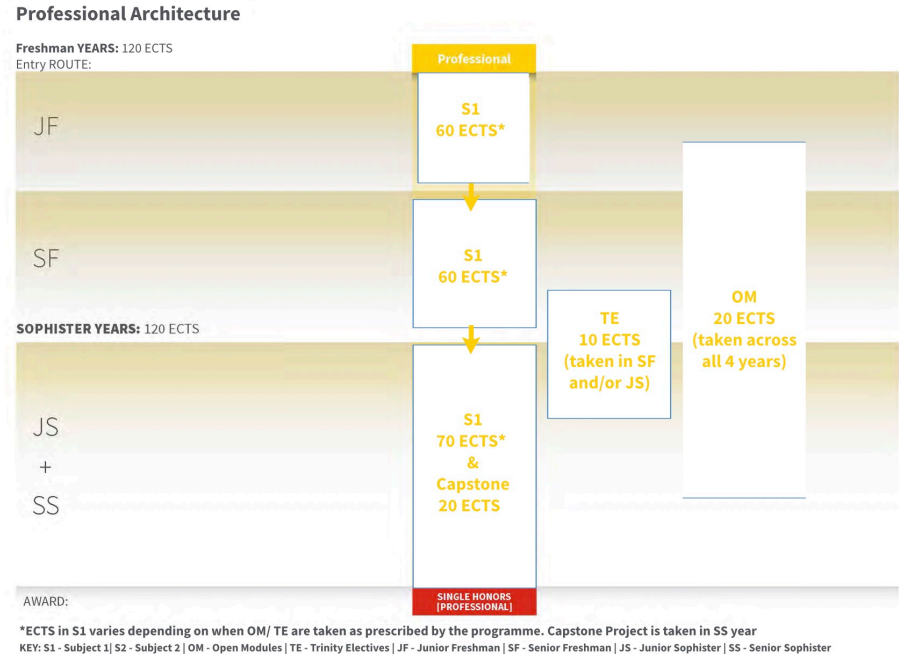
TP modules are taught by the School of Mathematics and the School of Physics:



Theoretical Physics TR035

TP and Trinity Education Project:

- TP is one of courses with a Professional Architecture
- Accredited by Institute of Physics
- Single entry and single exit



Competitive entry

- Entry requirement:
B in Leaving Certificate at Higher Level in both Mathematics and Physics
- Required CAO points are typically in the range 540-570

Course Structure

Year 1

- School of Maths: Calculus, Linear Algebra, Mechanics, Techniques for TP
- School of Physics: Special relativity, Optics, Statistics, Electro-magnetism, Quantum Mechanics, Laboratory work

Year 2

- School of Maths: Advanced Mechanics, Math. Techniques, Analysis, Geometry
- School of Physics: Thermodynamics, Electro-magnetism, Materials, Chaos and Complexity, Nuclear and Particle Physics, the Universe, Laboratory work
- **Module choice to develop your individual expertise:** Trinity Electives and Open Modules

Course Structure

Year 3

- School of Maths: Statistical Physics, Electrodynamics, Quantum Mechanics,...
- School of Physics: Atomic & Statistical Physics, Condensed Matter Physics, Laboratory work,...
- Open modules

Year 4

- School of Maths: Standard Model, Quantum Field Theory, General Relativity, Simulations,...
- School of Physics: Condensed Matter Theory, Nanoscience, Cosmology,...
- **Capstone research project**

Capstone project

- **Every student@TCD will have the opportunity for a Capstone project**
- **Wide range of subjects for Theoretical Physics:**
 1. Solid state physics
 2. Condensed matter
 3. Fundamental interactions
 4. Quantum field theory
 5. Quantum gravity
 6. Cosmology
 7. Holography
 8.
- **Supervised by TCD staff, who actively research these subjects**
- **20 ECTS which is about 33% of the year**



After graduating

Many of our graduates continue with a PhD to start an academic career.

Trinity College has a long tradition of leading theoretical physicists:

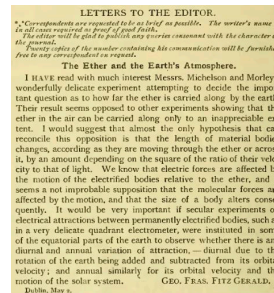
- Hamilton



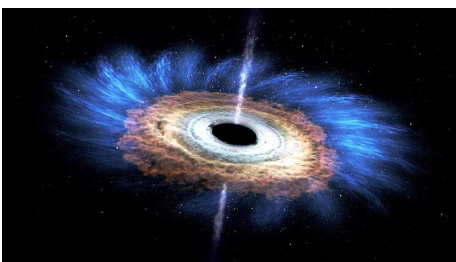
- Schrödinger

$$-\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2} \Psi + V \Psi = E \Psi$$

- Fitzgerald



- Synge



- Possibly you in the future?

Besides academia, our graduates find employment in the tech, software and financial sectors.



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Looking forward to welcoming you to
Theoretical Physics next September!

Thank you for your attention.