

1 Case Studies

The following table details some examples of possible pathways through the Programme. These case studies are for illustrative purposes only and show the breadth and diversity of the programme. Many other paths through the course are possible — and in fact much more eclectic or more generalist selections of courses may be appropriate for students who have not settled on a specialisation they intend to pursue eventually. Indispensable courses (“core”) for each given case study are indicated in bold. 1 unit=16 lectures; at least 10 units have to be taken over three terms. Note that some of the Case Studies below are sufficiently broad to allow multiple pathways within them, however you should ensure that your chosen pathway allows you to fulfil the requirements for the overall number of units and the number of assessed units. Please see the examination conventions for further details of these requirements.

<i>Pathway</i>	<i>MT</i>	<i>HT</i>	<i>TT</i>
<p><i>“TEORICA UNIVERSALIS”</i> (Generalist Theoretical Physicist) Core 4.75–5.75 units Total 10.75-13.25 units</p>	<p>1. QFT 24 2-4. Three of Advanced Quan. Th. 20 Noneq. Stat. Phys. 24 (4MT, 20HT) Kinetic Theory 24 GR I 16 Pert. Methods 16</p>	<p>1-3. <i>Three of</i> Advanced QFT 24 Quantum Matter 16 Adv. Fluid Dyn. 16 Soft Matter 16 Collisionless Plasma Physics 16 Cosmology 16</p>	<p>1-3. <i>Three of</i> Gauge-String Duality 16 Standard Model 16 QFT in Curved Space 16 Dissertation</p>
<p><i>“APPLICATA”</i> (Applied Mathematician) Core 5.5–7 units Total 10–11 units</p>	<p>1-2. Two of Noneq. Stat. Phys. 24 (4MT, 20HT) Kinetic Theory 24 GR I 16 3. Pert. Methods 16 4. <i>One of</i> Diff. Geometry 16 Num. Lin. Algebra 16</p>	<p>1. Adv. Fluid Dyn. 16 2. <i>One of</i> GFD 16 Networks 16 Collisionless Plasma Physics 16 Galactic Dyn. 16 GR II 16 3. Complex Variables 16</p>	<p>1-2. <i>Two of</i> Complex Systems* 16 Collisional Plasma Physics 16 Astrophysical Gas Dyn. 20 (10HT, 10 TT) Dissertation</p>
<p><i>“CONTINUA”</i> (Fluid Dynamicist) Core 4.5 units Total 10 - 10.5 units</p>	<p>1. Kinetic Theory 24 2. Pert. Methods 16</p>	<p>1. Adv. Fluid Dyn. 16 2. <i>Three of</i> Soft Matter Phys. 16 Collisionless Plasma Physics 16 GFD 16 Complex Variables 16</p>	<p>1-2 <i>Two of</i> Complex Systems* 16 Collisional Plasma Physics 16 Astrophysical Gas Dyn. 20 (10HT, 10 TT) Dissertation</p>

<p>“<i>GEOMETRA</i>” (Mathematician with a physics streak) Core 5.5 units Total 10–10.5 units</p>	<p>1. QFT 24 2. GR I 16 3. Diff. Geometry 16 3. <i>One of</i> Groups & Repr. 24 Algebraic Topology 16 Algebraic Geometry 16</p>	<p>1. String Theory I 16 2. <i>One of</i> Advanced QFT 24 SUSY & SUGRA 24 GR II 16 Geom. Group Theory 16</p>	<p>1. String Theory II 16 2. <i>Two of</i> CFT 16 Standard Model 16 Beyond the SM 16 QFT in Curved Space 16</p>
<p>“<i>PARTICULATA</i>” (Particle Phenomenologist) Core 8 units Total 10–11 units</p>	<p>1. QFT 24 2. Groups & Repr. 24 3. <i>One of</i> Stat. Mech. 16 GR I 16 Pert. Methods 16</p>	<p>1. Advanced QFT 24 2. SUSY & SUGRA 24 3. <i>One of</i> String Theory I 16 GR II 16 Cosmology 16</p>	<p>1. Standard Model 16 2. Nonpert. QFT 16 3. <i>One of</i> String Theory II 16 Beyond the SM 16 QFT in Curved Space 16 Astroparticle Phys. 16</p>
<p>“<i>SUPERCORDULA</i>” (Hard-core String Theorist) Core 7.5 units Total 10.5–11 units</p>	<p>1. QFT 24 2. Groups & Repr. 24 3. <i>One of</i> Stat. Mech. 16 GR I 16 Pert. Methods 16 Diff. Geometry 16 Algebraic Geometry 16</p>	<p>1. Advanced QFT 24 2. String Theory I 16 3. <i>One of</i> SUSY & SUGRA 24 GR II 16 Cosmology 16</p>	<p>1. String Theory II 16 2. CFT 16 3. <i>One of</i> Gauge-String Duality 16 Standard Model 16 Beyond the SM 16 QFT in Curved Space 16 Nonpert. QFT 16</p>
<p>“<i>CONDENSATA</i>” (Condensed Matter Theorist) Core 6.25 units Total 11.5–12.25 units</p>	<p>1. QFT 24 2. Advanced Quant. Th. 20 3. Noneq. Stat. Phys. 24 (4MT, 20HT) 4. <i>One of</i> Kinetic Theory 24 Topological Quantum Theory</p>	<p>1. Quantum Matter 16 2. Soft Matter 16 3. Advanced QFT 24 4. Adv. Fluid Dyn. 16</p>	<p>1. Topics Quant. CMP 8 2. Topics Soft Matter 8 3. CFT 16</p>
<p>“<i>DURACELLA</i>” (Hard-core Hard Condensed Matter Theorist) Core 4.25 units Total 10.75–11.75 units</p>	<p>1. QFT 24 2. Advanced Quant. Th. 20 3. <i>Two of</i> Noneq. Stat. Phys. 24 (4MT, 20HT) Kinetic Theory 24 Pert. Methods 16</p>	<p>1. Quantum Matter 16 2. <i>Two of</i> Advanced QFT 24 String Theory I 16 Adv. Fluid Dyn. 16</p>	<p>1. Topics Quant. CMP 8 2-3. <i>Two of</i> CFT 16 Gauge-String Duality 16 Nonpert. QFT 16</p>
<p>“<i>MOLLIS</i>” (Soft Condensed Matter Physicist/Biophysicist) Core 5.5 units Total 10 units</p>	<p>1. QFT 24 2. Noneq. Stat. Phys. 24 (4MT, 20HT) 3. Kinetic Theory 24 4. Pert. Methods 16</p>	<p>1. Adv. Fluid Dyn. 16 2. Soft Matter 16 3. <i>One of</i> Networks 16 Collisionless Plasma 16</p>	<p>1. Topics Soft Matter 8 2. Complex Systems 16</p>

<p>“<i>ASTRA-STELLA</i>” (All-round Astrophysicist) Core 7 units Total 10–11.5 units</p>	<p>1. Kinetic Theory 24 2. GR I 16 3. Rad. Proc. and High Energy Asto 20 4. <i>One of</i> QFT 24 Pert. Methods 16</p>	<p>1. Galactic Dyn. 16 2. Cosmology 16 3. <i>One of</i> Adv. Fluid Dyn. 16 Collisionless Plasma Physics 16 GFD 16</p>	<p>1. Astrophysical Gas Dyn. 20 (10HT, 10 TT) 2. Astroparticle Phys. 16 3. <i>One of</i> QFT in Curved Space 16 Dissertation</p>
<p>“<i>COSMICOSMICA</i>” (Dedicated Cosmologist) Core 4 units Total 10–10.25 units</p>	<p>1. GR I 16 2-3. <i>Two of</i> QFT 24 Kinetic Theory 24 Pert. Methods 16 Rad. Proc. and High Energy Asto 20</p>	<p>1. Cosmology 16 2. GR II 16 3. Astrophysical Gas Dyn. 20 (10HT, 10 TT) 4. Galactic Dyn. 16</p>	<p>1. QFT in Curved Space 16 2. Astroparticle Phys. 16</p>
<p>“<i>GAIA</i>” (Geophysicist/ Climate Physicist) Core 2 units Total 10–10.25 units</p>	<p>1. Kinetic Theory 24 2. Noneq. Stat. Phys. 24 (4MT, 20HT) 3. Pert. Methods 16</p>	<p>1. GFD 16 2. Advanced Fluid Dynamics 16 3. <i>One of</i> Networks 16 Astrophysical Gas Dyn. 20 (10HT, 10 TT)</p>	<p>1. Complex Systems* 16 2. Dissertation</p>
<p>“<i>PLASMA</i>” (Plasma Theorist) Core 5.5 units Total 10–10.25 units</p>	<p>1. Kinetic Theory 24 2. Noneq. Stat. Phys. 24 (4MT, 20HT) 3. Pert. Methods 16</p>	<p>1. Adv. Fluid Dyn. 16 2. Collisionless Plasma Physics 16 3. <i>One of</i> Astrophysical Gas Dyn. 20 (10HT, 10 TT) Complex Variables 16 Dissertation</p>	<p>1. Collisional Plasma Phys. 16 2. <i>One of</i> Dissertation Astrophysical Gas Dyn. 20 (10HT, 10 TT)</p>

* Please note that courses marked with an * may not be offered in 2016–17.