B 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.

Pathway	MT	HT	TT
Generalist Theoretical Physicist *"TEORICA UNIVERSALIS"* **Core** **6.25 units** Total 10.25-12.25 units	**1. QFT 24** **2. Kinetic Theory 28** **3. GR I 16** **4. Pert. Methods 16**	1-3. *Three of* **Noneq. Stat. Phys 16** Advanced QFT 24 Advanced Quan. Th. 20 Adv. Fluid Dyn. 16 Collisionless Plasma Physics 18 Random Matrix Theory Soft Matter 8 Cosmology 16 Quantum Matter 16	1-3. *Three of* Quantum Matter II 20 Renormalisation Group 20 The SM and Beyond I 16 The SM and Beyond II 16 Dissertation
Applied Mathematician *"APPLICATA"* **Core 7.75 units** Total 11.25 units	**1. Kinetic Theory 28** **2. GR I 16** **3. Pert. Methods 16** **4. Diff. Geometry 16** **5.** Num. Lin. Algebra 16 **6.** Riemannian Geometry **7.** Networks 16	**1. Adv. Fluid Dyn. 16** **2.** *One of* **Noneq. Stat. Phys 16** Geophysical Fluid Dynamics 16 Collisionless Plasma Physics 18 Galactic Dyn. 16 GR II 16 Random Matrix Theory 16 **3. Complex Variables 16**	Collisional Plasma Physics 18 Symbolic, Num. and Graphical Scientific Prog. 16 Dissertation
Fluid Dynamicist *"CONTINUA"* **Core 3.75 units** Total 10.75 units	**1. Kinetic Theory 28** **2. Pert. Methods 16**	**1. Adv. Fluid Dyn. 16** **2.** Soft Matter Phys. 16 **3.** Collisionless Plasma Phys. 18 **4.** Geophysical Fluid Dyn. 16 **5.** Complex Variables 16 **6.** Noneq. Stat. Phys 16	1. Collisional Plasma Physics 16 2. Dissertation
Mathematician with a physics streak *"GEOMETRA"* **Core 5.5 units** Total 10–11 units	**1. QFT 24** **2. GR I 16** **3. Diff. Geometry 16** **4.** *One of* Groups & Repr. 24 Algebraic Topology 16 Algebraic Geometry 16	**1. String Theory I 16** **2.** *One of* Advanced QFT 24 SUSY & SUGRA 16 GR II 16 Geom. Group Theory 16 Riemannian Geometry 16 Low Dimensional Topo. 16 Random Matrix Theory 16 Astroparticle Phys. 16	**1. String Theory II 16** **2.** *Three of* CFT 16 The SM and Beyond I 16 The SM and Beyond II 16

Particle Phenomenologist *"PARTICULATA"* **Core 5.5 units** Total 10 units	**1. QFT 24** **2. Groups & Repr. 24** *3. One of* GR I 16 Pert. Methods 16	**1. Advanced QFT 24** **2. SUSY & SUGRA 16** *3. Two of* String Theory I 16 GR II 16 Cosmology 16	*Two of* String Theory II 16 The SM and Beyond I 16 The SM and Beyond II 16
Hard-core String Theorist *"SUPERCORDULA"* **Core 7.5 units** Total 11.5 units	**1. QFT 24** **2. Groups & Repr. 24** *3. One of* GR I 16 Pert. Methods 16 Diff. Geometry 16 Algebraic Geometry 16	**1. Advanced QFT 24** **2. String Theory I 16** *3. One of* SUSY & SUGRA 16 Riemannian Geometry 16 Low Dimensional Topo 16 GR II 16 Cosmology 16	**1. String Theory II 16** **2. CFT 16** 3. *One of* The SM and Beyond I 16 The SM and Beyond II 16
Condensed Matter Theorist *"CONDENSATA"* **Core 3.5 units** Total 11.5–12.5 units	**1. QFT 24** **2.** Advanced Quant. Th. 20 3. *One of* Kinetic Theory 28 Topological Quantum Theory 16	**1. Noneq. Stat. Phys. 16** **2.** Advanced QFT 24 **3.** Adv. Fluid Dyn. 16 **4.** Random Matrix Theory 16 **5.** Low Dimensional Topo. 16	**1. Quantum Matter 16** **2.** Quantum Matter II 20 **3.** Renormalisation Group 20 **4.** CFT 16
Hard-core Hard Condensed Matter Theorist *"DURACELLA"* **Core 4.25 units** Total 10.5–11.25 units	**1. QFT 24** **2. Advanced Quant. Th. 20** **3.** Kinetic Theory 28 **4.** Pert. Methods 16	*Three of* 1. Noneq. Stat. Phys. 16 2. Advanced QFT 24 3. String Theory I 16 4. Low Dimesional Topo 16 5. Adv. Fluid Dyn. 16 6. Random Matrix Theory	**1. Quantum Matter 16** **2.** Renormalisation Group 20 **3.** Quantum Matter II 20 **4.** CFT 16
Soft Condensed Matter Physicist/Biophysicist *"MOLLIS"* **Core 5.25 units** Total 10.25 units	1. QFT 24 **2. Kinetic Theory 28** **3.** Pert. Methods 16 4. Networks 16	**1. Adv. Fluid Dyn. 16** **2. Noneq. Stat. Phys. 16** **3. Soft Matter 16** **4.** Collisionless Plasma 18	**1. Topics Soft Matter 8** **2.** Dissertation

All-round Astrophysicist *"ASTRA-STELLA"* **Core 3.75 units** Total 10.75–11.75 units	**1. Kinetic Theory 28** **2. GR I 16** *3. Two of* QFT 24 Quantum Processes in Hot Plasma 16 Pert. Methods 16	**1.Galactic Dyn. 16** **2. Cosmology 16** *3. Three of* Adv. Fluid Dyn. 16 Collisionless Plasma Physics 18 Rad. Proc and High Energy Astro 16 Astroparticle Phys. 16 High Energy Density 16	1. Dissertation
Dedicated Cosmologist *"COSMICOSMICA"* **Core 3 units** Total 10.75 units	**1. GR I 16** 2-5. QFT 24 Kinetic Theory 28 Pert. Methods 16	**1. Cosmology 16** **2. GR II 16** **3.** Galactic Dyn. 16 **4.** Astroparticle Phys 16 **5.** Rad. Proc. and High Energy Astro 16	1. Low Dimesional Topo. 16
Geophysicist/ Climate Physicist *"GAIA"* **Core 2 units** Total 7.75 units	1. Kinetic Theory 28 2. **Pert. Methods 16** 3. Networks 16	**1. Geophysical Fluid Dynamics 16** **2.** Advanced Fluid Dynamics 16 **3.** Noneq. Stat. Phys. 16	1. Dissertation
Plasma Theorist *"PLASMA"* **Core 5.75 units** Total 10.75 units	**1. Kinetic Theory 28** **2. Pert. Methods 16** **3.** Quantum Processes in Hot Plasma 16	**1. Adv. Fluid Dyn. 16** **2. Collisionless Plasma Physics 18** **3.** Noneq. Stat. Phys. 16 *4. One of* Complex Variables 16 High Energy Density 16	1. Dissertation 2. Collisional Plasma Physics 16