

2020/21 Postgraduate Open Day

MASt and Part III Astrophysics

Fatima Rasool (Course Secretary)
Vasily Belokurov (Course Coordinator)

Consult our website

The screenshot shows the website for the University of Cambridge Institute of Astronomy. The header features the university logo and the text 'UNIVERSITY OF CAMBRIDGE | INSTITUTE OF ASTRONOMY'. A search bar is located in the top right corner. Below the header is a navigation menu with links for Home, About, KICC, People, Research, Students, Talks, Public, Library, Meetings, Vacancies, Intranet, Contact, and Login. The main content area is titled 'Institute of Astronomy' and includes a breadcrumb trail: Home > Students > Current Undergraduates > Part III Astrophysics. A left-hand sidebar menu lists various student-related links, with 'Part III Astrophysics' selected. The main content area displays the title 'Part III Astrophysics - 2020-21' and a link to the 'Natural Sciences Tripos - Programme Specification: Part III Astrophysics'. It includes sections for 'Aims and objectives', 'How to Apply', and 'Key Contacts'. The 'Key Contacts' section contains a table with contact information for the Course Coordinator and Course Secretary.

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Search the site

Institute of Astronomy

Home | About | KICC | People | Research | Students | Talks | Public | Library | Meetings | Vacancies | Intranet | Contact | Login

Home > Students > Current Undergraduates > Part III Astrophysics

Students

- Prospective Students
 - Postgraduate Open Day
 - Undergraduate Study
 - Ph.D. Programme
 - M.Phil. in Astronomy
 - MASt in Astrophysics
 - Our Funding Partners
- Current Undergraduates
 - Part II Astrophysics
 - Part III Astrophysics**
 - Lecture Courses
 - Course Guide
 - Calendar
 - Research Project Booklet
 - Exam Papers
 - CATAM
 - Researcher Development
 - Student Self Isolation Form
- Current Postgraduates

Part III Astrophysics - 2020-21

[Natural Sciences Tripos - Programme Specification: Part III Astrophysics](#)

Aims and objectives

The Part III course is designed to develop students' analytical, critical and numerical skills to the point that they are equipped to undertake independent research in astrophysics. These aims are advanced through taught courses, which develop students' mathematical skills through detailed analysis of topics at the forefront of contemporary research and through the hands on experience of a substantial [research project](#). The project work encourages students to develop a critical attitude and an innovative approach to problem solving. The more independent working style is developed under the guidance of a supervisor from the Institute of Astronomy.

How to Apply

Those taking Part II Mathematics or Part II Physics who are interested in taking Part III Astrophysics in their 4th year should contact the Institute of Astronomy as early as possible (preferably no later than the end of the previous Easter term) to ascertain the likelihood of places being available. This is subject to obtaining a II.1 in Part II. In either case, please email ugadmin@ast.cam.ac.uk

More information on expected course prerequisites for Part II and Part III Astrophysics, can be found [here](#). **Please note the 2020 only update.**

Any requests for further information should be directed to Professor Chris Tout cat@ast.cam.ac.uk or to the undergraduate secretary ugadmin@ast.cam.ac.uk.

Key Contacts

	Contact	Phone	Office	E-mail
Course Coordinator	Vasily Belokurov	37515	Hoyle Rm 20	vasily@ast.cam.ac.uk
Course Secretary	Fatima Rasool	37552	Hoyle Rm 6	ugadmin@ast.cam.ac.uk

Important Dates and Info

- MAST applications close on Thursday 7th January 2021
- Interviews for the MAST will be held mid-late January 2021
- You can sign up to attend some of the general Q&A sessions here:
<https://www.postgraduate.study.cam.ac.uk/openday#GeneralSessions>
in particular:

Funding Opportunities at Cambridge presentation and Q&A

6th November 09.30-10.30

International Applicants Q&A

6th November 08.30-09.15 and 17.30-18.15

Course structure

- Courses (2/3 marks) + Project (1/3 marks)

Recommended lecture courses

Michaelmas 2020	Lent 2021
Physics of the Earth as a Planet † Dr J. Rudge, Dr D. Al-Attar & Dr J A Neufeld M.W.F. 9 <i>Pippard</i> [3 units] [P]	Formation of Structure in the Universe † Prof. R. Maiolino <i>TBC</i> [2 units] [P]
Cosmology Dr B. D. Sherwin M.W.F. 9 <i>Online</i> [3 units] [M]	Field Theory in Cosmology Dr T. Baldauf, Dr E. Pajer, E P S Shellard M.W.F. 10 <i>MR4</i> [3 units] [M]
Formation of Galaxies Prof. N. W. Evans M.W.F. 10 <i>Online</i> [3 units] [M]	Astrophysical Fluid Dynamics Prof. G. Ogilvie M.W.F. 10 <i>MR12</i> [3 units] [M]
Extrasolar Planets: Atmospheres and Interiors Dr N. Madhusudhan Tu.Th.S. 10 <i>Online</i> [3 units] [M]	Astrostatistics Dr K. S. Mandel M.W.F. 12 <i>MR5</i> [3 units] [M]
Relativistic Astrophysics and Cosmology † Prof. A. C. Fabian and Prof A. N. Lasenby M.W.F. 10.30 <i>Online</i> [3 units] [P]	Black Holes Dr J. E. Santos M.W.F. 12 <i>MR3</i> [3 units] [M]
Planetary System Dynamics Prof. M. Wyatt M.W.F. 12 <i>Online</i> [3 units] [M]	The Life and Death of Galaxies Prof. V. Belokurov M.W.F. 9 <i>MR14</i> [3 units] [M]
Particle Physics † Dr C. Lester M.W.F. 12 <i>Pippard</i> [3 units] [P]	Binary Stars Prof. C. A. Tout Tu.Th. 11 <i>MR13</i> [2 units] [M]
General Relativity Prof. H. S. Reall M.W.F. 12 <i>Online</i> [3 units] [M]	Astrophysical Black Holes Dr D. Sijacki M.W. 11 <i>MR14</i> [2 units] [M]
Structure and Evolution of Stars Dr A.N. Zytlow M.W.F. 11 <i>Online</i> [3 units] [M]	Exoplanets and Planetary Systems † Prof. D. Queloz <i>TBC</i> [2 units] [P]
Quantum Field Theory Prof. N. Dorey Tu.Th.S. 12 <i>Online</i> [3 units] [M]	Dynamics of Astrophysical Discs Dr H. N. Latter Tu.Th. 12 <i>MR13</i> [2 units] [M]

3 units
24 lectures
3 hour exam

2 units
18 lectures
2 hour exam

Lecture courses

- 2 sets of courses: **Physics** and **Maths**
- Physics major - exams in January
- Physics minor - exams in April
- Maths - exams in May/June

Lecture courses choice

- Choose at least some lecture courses that will help you with your Project (normally Astrophysics heavy)
- Read project descriptions and look at the notes and past exams
- Follow 6-7 courses and sit exams for 4 (max 5)
- Choose what interests you, but...
- Discuss your choices with the course coordinator and the project supervisor

Lecture course preparation

- Strong Astrophysics **Part II** foundation: Structure and Evolution of Stars, Stellar Dynamics and Structure of Galaxies, Astrophysical Fluid Dynamics, Introduction to Cosmology
- Lecture notes, examples and past exams are available
- check them out!

Research Projects

- You will need to provide a short report before Xmas
- You will need to write a **full report** and give an **oral presentation of your work** in front of a panel in Spring
- Project should contain [independent](#) and [new](#) research carried out by [you](#)
- Supervisors are there to guide and discuss (12 supervisions scattered over 3 terms)

Research Projects - Selection

- This year: 44 project choices for 29 students
- First 2 weeks of term: investigate and rank
- Up to 10 with a minimum of 5 ranked projects is required
- Impossible to rank projects without understanding the topic and the work involved
- Very difficult to understand the work involved without talking with the supervisor

Research Projects - Computing

- **Two computing** courses offered in Michaelmas
- One focused on Linux and the IoA computing infrastructure
- One focused on **Python** and coding best practices

Research Projects - process

- You simply can not do it last minute!
- Start surveying the literature and learning the tools as early as day 1
- Expect finding dead ends
- The bulk of work over Xmas break and in the beginning of Lent

There is more to this Course!

- We expect you to attend Institute talks (Wednesday Seminars and Colloquia on Thursdays)
- You could consider other talk series (find out how to keep up to date)
- It may be wise to go to **group meetings** (related to your Project)
- Journal Club will teach you to read and understand scientific literature

There is more to this Course!

- Public outreach <https://www.public.ast.cam.ac.uk>
get in touch with Matt Bothwell bothwell@ast.cam.ac.uk

MASt selection process

- Great Maths skills
- Great Applied Physics skills
- Research and Computing experience
- No need to find a Project topic in advance or contact supervisor

Get in touch!

- Please ask us (Fatima and I) whenever something is unclear
- Share your concerns with us
- This year many things evolved and are still changing
- Communicate
- Many of our current PhDs went through this Course, talk to them! **Let me know and I will put you in touch**

Have fun!