

Focus

Higher education

By Ian Howarth, Alan Longstaff, Keith Cooper, Gemma Lavender and Emily Baldwin

The twilight days of your school life have come around, and the prospect of University starts to dawn; then as someone with a burning – or even a passing – interest in astronomy (enough to be reading *Astronomy Now*), you'll be asking if you could, or should, be pursuing that interest as all or part of your degree studies. If you've got the right A-Levels (meaning, normally, good grades in at least three subjects, including physics and maths) my answer is simple: yes, you should!

Of course, many of the issues that you'll be pondering will be the same regardless of what subject areas you're considering. Your geography is an obvious factor, in two respects: are you desperate to get as far away from the family home as possible, or do you want the comforts of a continuing free meals and laundry service? And regulations on fees and loans vary from nation to nation within the UK, which will have to be taken into account. Only you can know how these considerations affect you; but supposing you've already narrowed down the range of candidate universities of interest, which courses should you be considering?

If you're mulling over possible 'astro' options, then the first thing that you should be aware of is that universities don't teach astronomy, even in courses with that name: they teach astrophysics. Don't expect to learn about the constellations, or the names of Saturn's moons; do expect to be taught about stellar evolution (why is Betelgeuse red and Rigel blue?), or how planetary systems form. If you choose a university with the right equipment, though, you may still have opportunities to carry out your own observations, primarily using CCD cameras (even if we all sneak the occasional look at the Moon through an eyepiece), and you should be trained in how best to reduce and analyse them, too.

With that background, you should seriously consider astronomy courses if your interests lie in the cosmic applications of physics. Don't feel obliged to opt for straight physics because of the old saw that "there are no jobs in astronomy". While it's true that not everyone who studies astrophysics at degree level will find a job in astronomy (though some of us do), consider the other side of the coin: how many people who study maths or physics at degree level will up with jobs

Studying astronomy and astrophysics at university

Ian Howarth of University College London describes why young people with a passion and curiosity for the Universe should seriously consider taking an astronomy or astrophysics undergraduate degrees course.





as mathematicians or physicists? The answer is, almost none – indeed, I'm sure that a bigger percentage of those studying astrophysics degrees go on to careers in astrophysics than do physics students into straight physics jobs.

The point here is that an astrophysics degree is at least as good as a physics degree in demonstrating to potential employers that you've got a sound scientific training. That training implies numeracy, logical thought processes, an ability to communicate ideas and basic IT abilities, all of which are the sort of skills that employers are looking for. That you've acquired those skills through courses in, say, cosmology rather than thermal physics is largely irrelevant. And if you get a chance to talk about your degree studies in that job interview, I guarantee you're going to get a lot more interest talking about the origin of the Universe than you would describing Carnot cycles! Moreover, studying a subject in which you're actually interested is the best possible motivation; the motivated student works harder, does better, and graduates with a higher degree grade. A 2:1 astrophysics degree is certainly going to put you in a much better position in the job market than someone with a 2:2 in physics.

Which course?

So, you've decided to go for the astrophysics; good! If you now check with UCAS, you'll see that 38 universities offer as many as 126 different 'astro' courses for 2012, many in combination with other subjects. How do you narrow down your choices? While there are exceptions, as a rule of thumb something like "Physics 'and' Astrophysics" will have a bigger astro component than a "Physics 'with' Astrophysics" course. Some universities offer highly modular courses that permit combined degrees in some surprising pairings – my favourite is 'Astrophysics and Criminology' (no, I'm not joking) – but you'll have to ask yourself the

extent to which these are designed as fully integrated degree courses, and how your chosen combination will look to potential employers, even if it happens to match perfectly your personal fascination with deep sky objects and flower arranging. Unless you've good reasons to do otherwise, I'd suggest sticking with courses that feature astronomy or astrophysics either as the core degree subjects, or in combination with physics (or mathematics, if your interests lie in that direction). That said, don't overlook the fact that you can often get a substantial astrophysics content in the increasingly popular Natural Sciences streams.

And obviously, once you've drawn up a long list of candidates, you should check detailed course contents. Don't be surprised if a supposedly pure astrophysics course actually contains a lot of basic physics; to understand spectra, you need to understand atomic physics, for example. Take advantage of open days to check out the facilities, and ask questions. If you're interested in observational astronomy, is there suitable equipment? Are the astro courses taught by astronomers, or by co-opted physicists? Does the host department have an active and diverse research programme (academics as well as students need to be motivated)? The more homework you do, the less danger of unwelcome surprises after you've signed up.

Another key question is whether to go for a three-year BSc course, or

a four-year MPhys. (Note that the MPhys, and equivalents such as the MSci, are sometimes called 'Masters' degrees, but are nonetheless first degrees; they shouldn't be confused with the MSc, which is a higher degree). Financial considerations will increasingly play a role in this decision in coming years, but my recommendation would be to sign up for the longer course at the outset. After three years' study, you'll be much better placed to make an informed decision about whether or not a fourth year is for you, and if it's not, you should be able to graduate straightforwardly with your Bachelor's degree. Do be aware, though, that if you're thinking of studying for a PhD, you'll be hard pressed to get into a good doctoral training programme without an MPhys/MSci, of 2:1 standard or better.

And finally, after much hard work (and, I hope, a little fun), you graduate with a degree in astrophysics; what do you do with it? The answer is, almost anything where skills in computing, modelling, problem solving, communications, research, design, or analysis are of use. This includes technology industries, teaching, IT departments and finance; astrophysics graduates I know of from my own department now occupy posts as diverse as investment advisor, television director, head of school science department, anaesthetist, biomedical engineer and even editor-in-chief of *Good Housekeeping* magazine. Many go on to PhD research, and of those not a few hold posts in astronomy, whether in teaching, research, or support roles. Some people do, after all, end up with a job in astronomy.

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