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for father, who gave us roots, for mother, who gave us wings.

## The Word from Mathieu Renzo, the Translator of the English Edition

There is no need to explain to amateurs why doing astronomical observations is cool. Almost everyone experiences some degree of amazement when they see a picture of the beauty up there in the sky, even those who don't care about things so distant from themselves. And being the person that reveals that beauty with their telescope is a great satisfaction. But there is more than just a challenge and an amusement in those pictures: they show us extreme (and most of the time hostile) conditions that we will never be able to reproduce on Earth. This is why astronomy is not only the first science that developed in the human history, but also a constant driver of scientific progress, always offering new puzzles to theorists.

Almost any field of modern physics stems directly from astronomy, and to explain astronomical observations we need almost every piece of modern physics available. The connection of some fields of physics with astronomy is trivial, for example Newtonian mechanics or General Relativity. But maybe not everybody knows that, for example, quantum mechanics was largely developed to explain stars, and in particular their spectra. And then nuclear physics (even if with a large and unfortunate contribution from military research), to explain why stars live so long, and so on. Even particle physics needs to fit within the big picture of cosmology.

The acquisition of spectra, that is the study of how the light entering the telescope is distributed in energy marks the transition from astronomy to astrophysics: it opens the door to go from observing to understanding. And understanding – even in a regime so far from what we might ever find on Earth – empower us. People often ask, for example, "why should we spend money for astronomy? Why not put all the money in curing cancer?" Well, one way to cure cancer is hadron therapy, which requires a good understanding of nuclear physics, that we acquired (also) looking at how stars live, evolve, and die!

Astronomy (or astrophysics, if you prefer) is also special among the sciences: we have no way to "control" what we can only observe, and therefore, except in very rare exceptions, we cannot perform experiments in the lab sense of the term. Nevertheless, by setting up your instrumentation, taking your first spectra, and asking yourself the questions that this book will suggest you, you can indeed practice the scientific method from which so much of our everyday life is based, but that so many people don't seem to understand.

One very important thing to note is that amateur astronomers did, can, and do contribute significantly to the scientific enterprise of understanding astrophysical phenomena. It doesn't necessarily take a professional, or a huge telescope: the main ingredient is just passion. Those below are just two examples that make no justice to the achievements of amateur astronomers.

Collectively, amateurs can observe every night, and provide uniform and long-term coverage of astronomical objects. For example, it is thanks to amateurs that we have more than 100 years of light curves of the dwarf nova SS-Cygni: every night someone, somewhere, observed it, even during the world wars. And this data set is still a precious gold mine to understand the physics of accretion disks.

Moreover, amateurs can, with a bit of luck, observe transient phenomena earlier than professionals. And their data, especially if spectroscopic, can be precious. For example, SN2016gkg has been discovered first by an amateur (who also took a spectrum of it!), and the prompt communication to the community has allowed for the study of the evolution of the spectrum of that explosion during the first few hours. This allowed observers (professionals and amateurs together) to probe events that happened in the last decades of the life of the star.

If you do good observations, like this book will teach you, and communicate them to other researchers, you are doing science. It doesn't take necessarily a fancy degree: again, most of it is just passion. Not being an amateur astronomer myself, I was glad to contribute to the translation of this book. I am a PhD student in theoretical and computational astrophysics, and my everyday work is far from the operation of telescopes and design of instruments. Translating this book was a very good way of refreshing this topic, and gain insight especially on the instrumental design. I hope this book will help passionate people contribute to the scientific endeavor of humanity, in ways that busy professionals competing with each other for telescope time cannot do.