

## Foreword

This book deals with the, happy, encounter of one of the oldest well-formulated scientific questions, namely the quest for "other worlds", with one of the most sophisticated developments in astronomical instrumentation, high contrast imaging. The quest for other worlds started indeed with the Greeks and has led, until the first scientific approach by Huygens in 1698, only to speculations by thinkers like Epicurus, Bruno, Descartes etc. A more profound question behind these other worlds is the existence of life outside the Solar System. It occupies a remarkable place in science: it is in the forefront of science and at the same time it is one of the easiest to understand by the general public and its philosophical and psychological subfoundations provides strong motivations to researchers.

Until the recent times, astronomical instrumentation was powerless to detect the other planetary systems. Starting in the late '30s, the search for extrasolar planets has first begun with astrometry. After some unfortunate false alarms (*e.g.* the case of the Barnard star), no exoplanet could be detected until the late '80s. The first successes came from the radial velocity and the pulsar timing techniques. These discoveries by the way present an interesting case of the non-linearity of the development of science. On the one hand, what was found was a series of complete surprises. On the other hand, with the interplay of announcements, retractions, rediscoveries of planets and the ambiguities of the mass value for the planets  $\gamma$  Cephei b,  $\epsilon$  Eridani b and HD 114762 b, it is not easy to tell what was the first planet discovered.

All these discoveries, making use of the parent star's wobble, detect the planets only indirectly, they do not "see" it. The amount of informations on the planet is rather poor and the stellar wobble alone does not help for the goal behind all these efforts: the detection of extrasolar life. Here then comes the main topic of the present book: the development of high contrast imaging techniques. The high contrast is mandatory because the planets are so faint compared to their parent stars. Since they are so close to the star, they also required a sufficient angular resolution. These two areas of astronomical instruments are experiencing spectacular developments, both in the domain of interferometry and in coronagraphy. They lead to ambitious instrumental developments at the major ground-based telescopes (such as the Very Large Telescope operated by the European Southern Observatory Organization) and space mission projects such as the european Darwin project and the numerous NASA projects. Major preliminary technological efforts on subsystems and components such as adaptive optics, coronagraphic masks are necessary.

The european astronomical community is very active in both the scientific and the instrumental aspects of the search for planets by imaging. Some of its members have met for one week and this volume presents an up-to-date account of this promising field of research.

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