

Detectors for Astronomy 2009

12–16 October 2009, ESO Headquarters, Garching, Germany

Astronomical observations are critically dependent on focal-plane array technology, and detectors continue to play a key role in continuing to extend the scope of astronomical observations. Higher sensitivity, reduced noise, larger formats, better cosmetic quality, higher quantum efficiency, smaller point-spread functions, lower dark current, higher bandwidth, and many more, constantly set new milestones on the roadmap towards the goal of artefact-free photon shot noise limited images of reality. One of the fastest growing applications is signal sensing, especially wavefront sensing for adaptive optics and fringe tracking for interferometry, which have become vital enabling technologies for both interferometry and extremely large telescopes. Topics of active research are large format Complementary Metal Oxide Semiconductor (CMOS) and Charge Coupled Devices (CCD) array mosaics, orthogonal transfer CCDs, electron multiplication CCDs, electron avalanche photodiode arrays, quantum-well infrared photon detectors, Application Specific Integrated Circuits (ASICs), blocked-impurity band arrays, novel readout technologies, to name a few. In a field with such rapid and complex developments, it is essential that designers, manufacturers and users gather regularly in order to exchange information about requirements, technical possibilities and achievements on a worldwide scale.

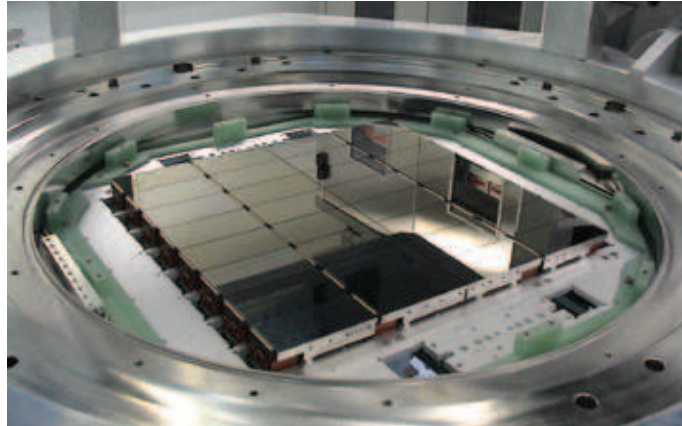


Figure 1. The 8 x 4 mosaic of e2v CCD82-44 2K x 4K CCDs (16K x 16K pixels in total) for OmegaCAM, which will capture the full 1 degree x 1 degree field of view of the VLT Survey Telescope (VST).

The 2009 Workshop Detectors for Astronomy aims at providing an up-to-date platform for such exchanges and continues a series of similar meetings in 1991, 1993, 1996, 1999 (all at ESO-Garching), 2002 (Waimea), and 2005 (Taormina). The 2009 meeting will specifically address the following topics:

- Detector technologies and design
- Detector manufacturing
- Detector evaluation and calibration
- Control electronics
- ASICs
- Control software
- Detector systems
- Mosaic focal-plane arrays
- Cryo-vacuum technologies
- Instruments with very demanding and/

- or novel requirements on detectors
- Scientific applications and results that depend on high performance detectors
- Test methodology and quality control
- Calibration of performance

Contributions are invited irrespective of wavelength and deployment on the ground or in space. The main focus will be on the optical and infrared domains. Depending on interest, splinter meetings dealing with topics of special interest can be organised. Contributions with demonstrations of hard- or software are welcome (subject to technical feasibility).

For registration and more information please visit www.eso.org/sci/meetings/dfa2009/.

ESO's Studentship Programmes: Training Tomorrow's Astronomers Today

Michael West¹
Marina Rejkuba¹
Bruno Leibundgut¹
Eric Emsellem¹

¹ ESO

Students are the lifeblood of astronomy, the next generation of astronomers. While other scientific disciplines are

facing declining student enrollments, the ASTRONET strategic plan for European Astronomy notes "young students have continued to enter the field at a steady level". Indeed, with Very Large Telescope (VLT), Atacama Large Millimeter/submillimeter Array (ALMA) the European Extremely Large Telescope (E-ELT) and other exciting new facilities on the horizon, it is hard to imagine a better time to be an astronomy student.

ESO is a leader in shaping the future of astronomy, and one important way to achieve this goal is by offering short-term and long-term studentships that provide excellent opportunities for students to pursue research under the supervision of ESO staff astronomers. Since its inception two decades ago, hundreds of young astronomers have spent some time during their PhD programme at ESO in Garching or Santiago. Many have gone on to leading positions



Figure 1. (Left) Group portrait of students at ESO Garching.

Figure 2. (Right) Students at ESO Chile enjoy an excursion to Paranal.



at universities, observatories and other organisations in Europe and beyond.

PhD Studentships

Through its PhD studentship programme, ESO offers training to future users of its state-of-the-art observational facilities. Students that come to ESO through the PhD studentship programme are already enrolled in doctoral programmes in astronomy, physics or related fields at universities in ESO member states or non-member state institutes.

ESO PhD students typically spend one or two years pursuing their doctoral research under the co-supervision of an ESO faculty astronomer, in close contact with activities and people at one of the world's foremost observatories. After returning to their home universities, these students are often expert users of ESO observing facilities. Upon the completion of their PhD a large majority of these students pursue a career as a professional astronomer, and some have become postdoctoral fellows or staff astronomers at ESO.

Short-term studentships

Opportunities also exist for a limited number of students to come to ESO for periods of one to three months to work on research projects with ESO astronomers. Such positions are usually funded

by the Director General Discretionary Fund, which supports a broad range of needs related to scientific projects by ESO staff astronomers.

There is no formal application procedure for short-term studentships at ESO. Students interested in the possibility of working on a short-term research project at ESO should explore the science staff web pages to identify one or more ESO staff astronomers with whom they might wish to work and then contact those astronomers directly, or contact the Head of the Office for Science in Garching or Santiago for more information.

Students in Garching

Currently 22 students from 15 countries are working on their PhD research at ESO Garching (see Figure 1). Fifteen of them are enrolled in the ESO studentship programme and will spend one or two years at ESO during their PhD and will receive the degree from their home university. One student is participating in an exchange programme with Chinese universities, and six students are enrolled in the International Max-Planck Research School (IMPRS) on Astrophysics.

ESO's Garching Headquarters forms part of one of the world's largest centres for astronomy and physics, with other leading institutes such as the Max-Planck Institute for Astrophysics, the Max-Planck Institute for Extraterrestrial physics, MPE, the Institute for Plasma Physics, the Max-Planck Institute for Quantum Optics and the campus of the Munich Technical University nearby. The strength of this concentration of scientific expertise was recently recognised by the German authorities, and led to the creation of the Excellence Cluster on the "Origin and Structure of the Universe". In such a vibrant environment students have an abundance of choice for seminars and lectures with unique opportunities to learn about the hottest topics and most important open questions in physics and astronomy.

Students in Santiago

Surrounded by the splendour of the Andes Mountains, seven students are currently pursuing their PhD research at ESO offices in Santiago, together with a constant stream of short-term students (Figure 2). During the past year alone, students from universities in Belgium, Chile, Denmark, England, France, Germany, Iceland, Italy, Portugal and the United States have participated in ESO Chile's short-term and long-term studentship programmes. ESO offices in Chile provide a stimulating scientific environment for students, with a science team of nearly 80 staff astronomers, fellows, students and visitors, plus close connections with ALMA and the astronomy departments at top Chilean universities in Santiago and beyond.

In addition to engaging in scientific research under the supervision of an ESO staff astronomer, students at ESO Chile have a unique opportunity to get hands-on experience with the technical aspects of observatory operations at Paranal, La Silla, ALMA or the Atacama Pathfinder Experiment (APEX), a millimetre/submillimetre telescope. This month, for example, ESO Chile PhD student Pedro Almeida will travel to La Silla to spend two weeks working on polarimetry data from EFOSC2 and participating in observations using HARPS, all under the guidance of ESO astronomers.