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**A science year is more than 12 months – inspirations from the International Year of Astronomy 2009 and its legacy**

The 2009 UN International Year of Astronomy was a global celebration of astronomy and its contributions to society and culture. It created the largest-ever international network of scientists, astronomy communicators, teachers and amateurs working closely together to promote and communicate astronomy to the public. Looking back at the goals and achievements of the International Year of Astronomy 2009, and noting how much it still lives on today, demonstrates the significant and long-lasting impact that science years can have on society, scientific awareness, education and enhancing collaboration across nations. The German-South African Year of Science, for which Astronomy is one theme, is a chance to initiate and continue such activities.

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Christian Fendt

Max Planck Institute for Astronomy, Heidelberg

IMPRS for Astronomy and Cosmic Physics at the University of Heidelberg

**Graduate Education in Astronomy/Astrophysics: The Example of the International Max Planck Graduate Schools**

The presentation discusses the concept of the International Max Planck Graduate Schools (IMPRS) of the Max Planck Society in collaboration with the local universities, presenting – as an example – the Heidelberg IMPRS on Astronomy and Cosmic Physics. In total, five astronomy-related IMPRS schools exist in Germany (while more than 60 schools exist covering almost all scientific disciplines). The IMPRS concept has changed the way of obtaining a doctoral degree at a Max Planck Institute. Traditionally there has been a pure supervisor-student relation, while nowadays the graduate school system involves co-supervision by a thesis committee and a structured course programme for the student. Within the school, a number of common scientific and social activities are organised for the students.

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Dr Cecilia Scorza

Haus der Astronomie, Heidelberg

**Astronomy as a motor of education, cultural and social integration**

Astronomy is not only a fascinating science driving both advances in knowledge about our Universe and technology, but has also been proven to be a powerful tool to broaden children's worldview at an early age, building scientific attitudes and fostering social and cultural integration at the same time. Perhaps the most important impressions left on children after they have been exposed to astronomy are that the Earth is a unique multicultural space in which humankind has expressed itself in many

different but equally valuable ways, that we are part of the Universe, and that the Universe is beautiful and waits to be discovered.

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Dr Christian Spiering  
(DESY Zeuthen)

**Astroparticle physics in South Africa – a tribute from Germany**

This presentation sketches the remarkable contributions of South Africa to cosmic-ray, gamma-ray and neutrino astrophysics from a German perspective. The first cosmic neutrino was detected in the Witwatersrand Mine in 1965. During the past four decades, the Potchefstroom group contributed significantly to the detection of air showers from gamma rays and cosmic rays. German and South African groups are successfully cooperating on the HESS gamma-ray observatory in Namibia. Namibia is one of the site candidates for a future worldwide gamma-ray telescope, the Cherenkov Telescope Array, in which Germany plays a leading role and South Africa is a strong local partner.

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Prof Dr Martin M Roth  
Leibniz Institut für Astrophysik Potsdam, Universität Potsdam

**Innovation in Instrumentation: Impact of 3D-Spectroscopy over the past decade**

Integral field spectrographs are found at almost all major ground-based telescopes and, on board the James Webb Space Telescope, will soon fly in space. The arrival of inventions as innovations in astronomy will be described in this presentation, along with the Potsdam Multi-Aperture Spectrophotometer, which has paved the way for many applications, such as Herbig-Haro objects, H II regions, planetary nebulae, extragalactic resolved stars, and emission line objects in the nearby Universe. Today 3D spectroscopy in the optical and near infrared spheres is a mature technique, and more complex and expensive second-generation instruments are being built. The VIRUS instrument for the Hobby-Eberly Telescope Dark Energy Experiment, and the Multi-Unit Spectral Explorer for the ESO Very Large Telescope Observatory will be discussed. Efforts to make the success story of 3D spectroscopy available in other scientific disciplines, and perhaps in the industrial sector as well, are explained.

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Prof Dr Joachim Köppen  
Institut für Theoretische Physik und Astrophysik, Universität Kiel and Observatoire  
Astronomique de Strasbourg

**Practical radio astronomy for students: A view of our galaxy at 21 cm wavelength**

Performing real observations is an indispensable experience in the education of students in astrophysics and in the physical sciences. Performing direct observations and analysing them allows students to experience the reality and limitations of

measurements, and the way scientific results are extracted from data. Small radio telescopes offer students the opportunity to observe the sky at wavelengths invisible to direct human perception. In the age of the Internet, it is feasible to operate telescopes by remote control. Thus we should envisage making small radio telescopes in both hemispheres accessible to students everywhere, so that they will be able to observe any part of our galaxy themselves.

Prof. Dr Michael Kramer

Max Planck Institut für Radioastronomie

**Radio astronomy in the future – a global perspective from a German viewpoint**

Huge advances in digital electronics, commodity computing and data interconnectivity have enabled radio astronomy to undergo a revolution. Next-generation telescopes like the Square Kilometre Array and its pathfinders like MeerKAT are using modern technology for massive advances in sensitivity and survey speed. Developing and employing this technology now provides the opportunity to allow already long-established facilities a sudden boost in their capabilities. The presentation reviews ongoing efforts regarding such activities in Germany and how these relate to the wider context of the SKA and its pathfinders.