EP 2: Astrophysik II

Time: Monday 11:30–12:30 Location: H46

Invited Talk EP 2.1 Mon 11:30 H46

eROSITA: telescope calibration and science expectations — •Michael Freyberg — MPI f. extraterrestrische Physik, 85748 Garching, Germany

The "eROSITA" (extended ROentgen Survey with an Imaging Telescope Array) observatory will be launched in the 2010-2011 timeframe with the Russian "Spectrum-RG" mission. The optics will consist of 7 Wolter-I telescopes with 54 nested mirror shells each, which will look in parallel. The focal plane instrumentation will be equipped with newly developed framestore CCD devices. The mission will perform several complete all-sky surveys in the first years, along with wide-area and deep surveys towards the galactic poles.

The primary science goal is the detection of about 50-100 thousands of cluster of galaxies, to study the large scale structure of the universe and to test cosmological models, including the quest for "dark energy".

Moreover, eROSITA will not only perform the first all-sky survey with imaging telescopes in the 2-10 keV energy range, but also provide much better spectral resolution in the 0.2-2 keV range, previously covered by the ROSAT PSPC All-Sky survey in 1990. This will also allow detailed studies of diffuse and thermal emission, like from supernova remnants or from the interstellar medium in general. We will summarize the future calibration of the telescopes, and highlight some of the science return expected from the mission.

EP 2.2 Mon 12:00 H46

Device Simulation and First Measurements of a New Avalanche CCD for Single Optical Photon Imaging — •I. Ordavo[1,4], R. Eckhardt[1,4], R. Hartmann[1,4], P. Holl[1,4], G. Lutz[1,4], R. H. Richter[3,4], H. Soltau[1,4], L. Strüder[2,4], and G. Vâlceanu[2,4] — [1]PNSensor GmbH, Römerstraße 28, D-80803 München — [2]Max-Planck-Institut für extraterrestrische Physik, Giessenbachstraße, D-85748 Garching — [3]Max-Planck-Institut für Physik, Föhringer Ring 6, D-80805, München — [4]MPI Halbleiterlabor, Otto-Hahn-Ring 6, D-81739 München, Germany

The concept of a new CCD for single photon detection has been developed at the Max-Planck-Institute Semiconductor Laboratory (HLL) and PNSensor. Besides the established design of back illuminated pnCCDs, relevant optimization toward photon counting is the integration of an avalanche diode whose sensitivity to single electrons has been confirmed by measurements. An on-chip MOSFET provides additional signal amplification and low noise coupling to following readout stages. The overall detection efficiency is expected to be as high as 80% in a wide range of wavelengths. The device can be set to operate in a fast readout mode (above 1000 frames/sec) achieving high time resolution and avoiding signal pileup at the same time. At higher photon rates, increasing the integration time would allow to switch off the avalanche multiplication yielding an image proportional to light intensity. First measurements performed on test structures along with full device simulations are presented. Possible applications include High Time Resolution Astrophysics (HTRA) and wave front sensing for Adaptive Optics.

EP 2.3 Mon 12:15 H46

Impact of Turbulence on Observations — •Ralf Kissmann[1], Horst Fichtner[1], and Rainer Grauer[2] — [1]Institut für Theoretische Physik IV, Ruhr-Universität Bochum, 44780 Bochum, Germany — [2]Institut für Theoretische Physik I, Ruhr-Universität Bochum, 44780 Bochum, Germany

The properties of the turbulent fluctuations in the different phases of the ISM are of eminent interest for many branches of astrophysical research. The access to these fluctuation via observational means, however, is limited. Additionally, the connection of the observational results to the actual plasma state is ambiguous in most cases. This can best be investigated by way of numerical simulations. For this we applied the known observational methods to the results of such a simulation.

In this context we will present most recent results obtained using a numerical model for the warm interstellar medium. From these simulations we extracted many of the known observational measures. We will show that these observations have to be interpreted with great care even for the rather quiet state of the warm interstellar medium.