PAINEL 169

SKY CONDITION ANALYSIS WITH AN "ALL-SKY CAMERA"

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Using a CCD camera (SBIG/ST8E) and a 35mm photographic lens we developed an "all-sky camera" to be used as a judge by the brains of our robotic telescope. The idea is to use these images to decide whether the night is photometric, spectroscopic, or unusable. This will certainly make the use of the telescope much more efficient. To operate the system we are building a sky atlas with our camera under photometric conditions. All images are taken in integer minutes of sidereal time. When the camera is working in "robot" mode it compares the current image to one in the atlas (the atlas must be made with the exactly same equipment) and decides what the conditions of the night are. Based on this result the queue administrator computes the list of objects to be observed. Current tests with our system show an rms scatter of around 0.02 magnitudes for bright stars. In addition to determining sky conditions we are also able to measure extinction coefficients to a 1% precision.

PAINEL 170

MOPS: A DUAL CHANNEL MICROWAVE RADIOMETER FOR SOUNDINGS OF ATMOSPHERIC OPACITY AND WATER ABUNDANCE

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MOPS, the Microwave OPacity Sounder, is a passive, ground-based microwave radiometer that is currently under development at IAG. It consists of two independent Dicke receivers that detect the thermal atmospheric emission at 22.2 and 31.6 GHz. The atmospheric opacity at this frequencies will be determined by elevation scans (tipping curve). Furthermore the total water column amount will be retrieved. Due to different sensitivities of the channels to emissions caused by water vapor and cloud liquid water, a separation of both constituents is possible. *MOPS* is intended to provide data about the atmospheric attenuation in order to assess the quality of existent or potential radio astronomical observation sites. Besides the application in astronomy the collected data are beneficial in the field of meteorology and remote sensing. The poster will describe the hardware of *MOPS* and will explain the employed measurement and calibration methods. In addition results of first operational tests of subsystems will be presented.

PAINEL 171

CONCEPTUAL DESIGN FOR THE SOAR TELESCOPE ECHELLE SPECTROGRAPH

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As part of the Brazilian collaboration on the 4.2m SOAR telescope second generation instruments, a multi-institutional team proposed the construction of a Échelle Spectrograph with UV capability. In view of its high image quality and moderately large collecting area, SOAR will be able to yield high quality spectroscopic data for a large variety of objects of astrophysical interest. Besides, it can provide important data on objects that would supplement the samples of faint targets observed with Gemini. Another point that should be explored in SOAR is the UV capability, not available in most of the present high-resolution spectrographs. The proposed spectrograph will be a cross-dispersed échelle fed by the Nasmith focus. It will work on a quasi-Littrow configuration with white pupil, covering the spectral region from 3000 to 8500 Å (in 2 shots) at R = 50,000 (with a 1 arcsec slit - up to R = 70,000 with narrow slit or image slicer). Overall instrument efficiency is intended to peak at 25% in 6500 Å and 10% in 3200 Å. We present an overview of the spectrograph conceptual design, a brief report on the status of the project, and discuss the schedule for the funding and construction as well as the scientific aims.

PAINEL 172

A MATHEMATICAL MODEL FOR THE MECHANICAL BEHAVIOR OF MARIO SCHENBERG GRAVITATIONAL WAVE DETECTOR

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Gravitational waves are local perturbations on space-time curvature, which travel through it with speed of light. A passing gravitational wave excites quadrupolar vibrational modes of elastic bodies and makes them to oscillate. The monitoring of the oscillations will able us to detect gravitational waves directly and will provide important informations about astrophysical sources features. Some research groups are constructing instruments to work as gravitational waves detectors. In this work, we present a mathematical model for the mechanical behavior of the "Mario Schenberg", the Brazilian spherical gravitational wave detector. The physical parameters that affect this behavior are found by application of a linear elastic theory. The model gives us the

ressonance frequencies of the system when six i-modes mechanical resonators are coupled on the antenna surface according to the arrangement suggested by Johnson and Merkowitz: the truncated icosahedron configuration. That configuration presents special symmetries, which make possible to derive an analytic expression for monitoring the channel modes that are a direct measurement of tensorial components of the gravitational wave. By using this model, we also simulate how the system behaves under a gravitational sinewave quadrupolar force, and find the relative amplitudes that result from a gravitational wave excitation. The mechanical ressonator becomes the signal stronger than ≈170 times. We found i+1 degenerated quintuplets plus i no-degenarated ressonance frequencies that cover 3.0-3.4kHz bandwidth with sensibility enough to detect signals with $\tilde{h} > 10^{-22} Hz^{-1/2}$. An analytic expression to estimate instrumental noise contribution to the system movement is also presented. This work was supported by CAPES and FAPESP 01/14527-3.

PAINEL 173

SEARCH FOR VARIABILITY IN CLUSTERS USING A ROBOTIC TELESCOPE

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This is a continuation work on developing a robotic telescope at UFSC. Using our prototype robotic telescope we are observing five open clusters trying to confirm, and possibly discover, variable stars in these fields. To achieve this we have cycled through the five clusters all night long, in a sequence given by our scheduling software, approximately one hour per cluster, using CCD photometry. These measurements are the first real test of our robot in trying to do real astronomical observations. These observations are of great value in determining the reliability of the whole system, and gives us hints on the next steps to be followed. These observations will be carried with crescent frequency as the robot evolves, until it is fully autonomous. In this presentation we also discuss details of the whole system, showing how all the observatory components have been implemented and how they talk to each other.

PAINEL 174

THE R=50k OPTICAL CAMERA FOR THE GEMINI bHROS (BENCHMOUNTED HIGH RESOLUTION OPTICAL SPECTROGRAPH)

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As part of a strategic effort by the Brazilian astronomical community to take an active part in the development of scientific instrumentation, Brazil has proposed to develop a (comparatively) low-resolution optical camera system for the Gemini bHORS (R=150k) spectrograph. It will enable astronomers to obtain spectra with a resolution R=50k, an option which is not only particularly interesting for a significant fraction of the Brazilian Gemini users, but also for many astronomers from other partner countries. The brazilian participation in the Gemini Observatory and the SOAR project have strengthened their development capabilities and this particular initiative has the funding support for the design phase of the project by a grant from the Brazilian government within an encompassing effort to strengthen scientific and technological progress, backed by the Millennium Institute MEGALIT. The bHROS is a benchmounted reconfiguration of the Gemini HROS with a fiber-fed cross dispersed R=150k capability. The bHROS construction is underway by the University College London (UCL). The R=50k camera that we proposed is an interchangeable enhancement module recovering the R=50k capability, impacting a large range of science originally targeted for HROS. We present the optical and mechanical conceptual design for the R=50k module, the predicted efficiency and discuss the funding and construction perspectives.

PAINEL 175

DATA REDUCTION SOFTWARE FOR IFU SPECTRA

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As part of the Brazilian collaboration on the 4.2m SOAR telescope project we are building an Integral Field Unit Spectrograph (SIFUS), whose prototype (Eucalyptus) is being commissioned at the 1.6m telescope of the Pico dos Dias Observatory (Brazil). As the fiber spectra are tightly packed on the CCD (FWHM=3 pixels, spacing between spectra = 3 pixels), special procedures are required for data reduction. We present the first beta version of the data reduction software being developed for the Eucalyptus and SIFUS spectrographs.