A new instrumentation project for the Lomnický štít coronal station

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The project for a new telescope/auxiliary instrumentation system for the solar coronal station at Lomnický štít (2632 m asl) is described both in general concept and with regard to some particular technical details. In preparing the project we have attempted to consider and summarize all possible and accessible observational ideas and their technical solutions for simultaneous coronal and non-coronal observations at this high-altitude observatory.

The main aim of the system is to observe near-limb photospheric and chromospheric layers of the solar atmosphere in the white light, narrow-band imaging and magnetometry, as well as to perform visible and near-infrared spectroscopy and spectropolarimetry of the parts of the solar disk already mentioned.

This type of data, measured simultaneously with coronal emission line profiles, regularly obtained at this time by the coronagraph, could yield a large amount of physical information about the solar activity events and the height distribution of energy, mass, magnetic and velocity fields therein as well as their time evolution.

The initial ideas, motivation of the project and the parameters of the system components - refractors, narrow band filters, focal plane detectors and fibre optics positioners, telescope-spectrograph coupling via fiber optics, spectrographs, detectors and computers for observations control, and data acquisition - are explained and discussed.

We have found that even moderate size refractors could collect enough light both for the white light and narrow-band imaging, and for high resolution conventional long-slit and echelle spectroscopy.

The application of a 'night-time' version of the positioning device in the focal plane of the telescope could solve the problem of placement of the coronagraphs and non-coronal refractors on the same mounting, and of simultaneous observations of different parts of the solar disk.

The optical fibers are proposed to connect the moveable telescope and stationary spectrograph and some comments about the geometrical configurations

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of fibers are added. Some problems of this technique and their promising solutions for the solar spectroscopy were discussed.

The different types of spectrometrics and polarimetric techniques proposed for the project are discussed. At present we would like to find the 'optimal' compromise between the conventional Czerny-Turner and echelle spectrographs - a large solar echelle spectrograph with predisperser equipped with exchangeable gratings/prisms.

More TV CCD detectors connected to the advanced frame grabber and IBM PC's are being considered for the data acquisition of 2D direct images and 1D spectra at the TV frequency.

Finally, the future prospects of the project are briefly described.

Contents : 1/ Introduction. 2/ Project conception. 3/ Telescopes. 4/ Positioners. 5/ Direct imaging. 6/ Fiber optics telescope spectrograph coupling. 7/ Spectroscopy. 8/ Detectors. 9/ Polarimetry. 10/ PC processing concept. 11/ Conclusions.

Remark : The full text of the paper is available at the author's address in the re-print form as well as in the form of LATEX source file. Requests can also be addressed to the EUnet address : astrryba@asu.savba.cs .

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