Fine structure and dynamics of the quiescent prominences. 15-cm coronagraph for Rozhen NAO.

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Фина структура и динамика на спокойни протуберанси 15 см кoронограф за НАО - Рожен

Никола И. Петров. Анотация на дисертация

The dissertation comrises the results of the author in two directions - investigation of solar prominences with high quality observing material and building of the solar coronagraph for the Rozhen National Astronomical Observatory.

I. Investigations of the quiescent prominences nature

The phenomenon of the quiescent prominence is the clearest manifestation of the interaction between the solar magnetic field and the moving coronal plasma. By this reason the detail investigation of such prominences is very important for the solar physics. Digital processing of high resolution H-alpha spectrograms and filtergrams of quiescent prominences is carried out by the author on observing material from Pic-du-Midi Observatory, belonging to the Astronomical Institute of Wroclaw University. The Doppler velocity field of the prominence plasma details is mapped and analyzed. The results show that the whole prominence and its fine structure participate in a global periodic movement. Oscillations of the prominence fine structure within periods of about 58 min and 38 min are found. The consideration is that the cause for oscillations is the dominant effect of kink-modes Alfven waves with intermediate duration.

II. Assembling and testing the first solar coronagraph in Bulgaria and the Balkans

The monitoring of the solar photosphere and corona out of the total solar eclipses is an important astronomical problem. The first step of the Solar Division in the Institute of Astronomy toward solar observations was made in 1994. Then a solar tower with 8-m dome was built in the territory of the Rozhen NAO, at 1750 m above the sea level. The opportunely furnished parallactic mounting allows assembling of at least two basic solar instruments: refractor and coronagraph. Initially one 13-cm solar refractor was assembled for white-light observations of the solar photosphere and the activity events at photospheric level. The new, Lyot type coronagraph for prominence observations, was assembled in June 2005. Its construction was designed to enable visual, photographic and cinematographic observations in the H-alpha light. Descriptions of the instrument and its facilities are presented. The first observations with the coronagraph and the comparisons with other similar instruments are presented too. The science objectives related with the elucidated possibilities of the coronagraph are considered.

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Key words: prominences, telescopes