

**Title:** Horizontal plasma motion in the solar photosphere

**Author:** Michal Švanda

**Department:** Astronomical Institute of Charles University

**Supervisor:** Ing. Miroslav Klvaňa, CSc., Astronomical institute AS CR Ondřejov

**Supervisor's e-mail address:** mklvana@asu.cas.cz

**Abstract:** Horizontal velocity fields in the quiet solar photosphere are measured using motions in the supergranular network, derived from full-disk dopplergrams obtained by the MDI instrument onboard the SoHO space observatory. It turns out that the magnitudes of studied motions can lie below the level of noise caused by local evolutionary changes of the supergranular network. We describe methods used to suppress such noise and to prepare Doppler measurements from MDI/SoHO for the analysis of the horizontal velocity fields by means of the local correlation tracking (LCT) technique. We describe ways how to choose appropriate values of free parameters of LCT. We elaborated a large program package using IDL programming language, which allows automatical processing and preparation of the source data, and we processed two fifteen-days observing series situated in the period of the solar minimum. Results obtained with the LCT method for quiet Sun are demonstrated. We developed techniques of visualisation of the computed horizontal velocity fields and discuss advantages and drawbacks of each one. From the computed velocity fields we construct plots of the curves of differential rotation and meridional circulation.

**Keywords:** Sun – photosphere – velocity field – supergranulation