

Mass of solar prominences estimated from multi-wavelength data

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Abstract. The mass of selected prominences was estimated using their multi-wavelength observations. Prominences were observed in the H_{α} line by the HSFA2 spectrograph of the Ondrejov observatory, in EUV by SoHO/EIT and in the soft X-rays by Hinode/XRT. We took all observations of prominences made by HSFA2 between April and September 2007 and searched for quasi-simultaneous and suitable EIT and XRT data. For identification of the H_{α} prominence in EUV the EIT 304 A channel was used. For co-alignment of EIT observations with XRT, EIT in 284 A channel was used. Seven prominences from those observed in the H_{α} line were reliably identified in EUV and their suitable X-ray observations were found. For these prominences the maps of the continuum optical thickness at 195 A were computed using the spectroscopic method developed in Heinzel et al. (2008). The method takes into account two mechanisms responsible for a depression of the coronal radiation at 195 A at the prominence location: absorption by the prominence plasma in hydrogen (HI) and helium (both HeI and HeII) resonance continua and the so-called emissivity blocking which is the lack of coronal EUV emissivity in volume occupied by the prominence itself and the surrounding cavity. Using the teoretical work of Anzer&Heinzel (2005) and following Heinzel et al. (2008), the hydrogen column density was derived from the optical thickness at 195 A. Finally, the total mass of the prominence was computed by integrating the column mass throughout the whole prominence area. We compare our values with those previously obtained. Estimated mass values ranged from 2.0E10 to 3.0E11 kg.