M36a Properties of the transition region observed with Hinode/EIS

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Properties of the transition region of the quiet region are studied by using He II λ 256.32 ($\log T_e = 4.7$) spectra obtained with Extreme-ultraviolet Imaging Spectrometer (EIS) on board *Hinode*. The EIS can observe several transition region lines, even though its primary target is the corona ($\log T_e > 6$). He II λ 256.32, the coolest line available for EIS, is blended with Si X λ 256.37 ($\log T_e = 6.0$) and makes it difficult to interpret the spectra. However, the contribution of Si X λ 256.37 can be compensated by using Si X λ 261.04 since they are density insensitive pair lines (Young et al. 2007). Our analysis shows that this compensation is crucial for the study of the Doppler shift and line width of He II λ 256.32.

EIS data of the quiet region near disk center were selected and reduced in this paper. Line profiles of He II λ 256.32 were deduced from the spectra by subtracting Si X λ 256.37 contribution. Many line-broadening features are found near the edge of the super-granular network. The amount of excess width corresponds to 60 km/s in the Doppler velocity. They are not seen in the coronal emissions such as Fe XII λ 195.12. Some of them are accompanied by bi-directional flows, which are the signatures of the explosive events (Innes et al. 1997). There is a weak correlation between the radiance and mean Doppler velocity in He II. The bright network tends to be red shifted with respect to the dark internetwork. This result agrees with previous studies (Brynildsen et al. 1995 , Brekke et al. 1997) and has implications for the net red shift of the transition region (Peter et al. 2004).