

Study on electron density diagnostics of silicon VIII ion for non-Maxwellian distribution in solar transition region

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For accurate electron density diagnostics in the solar transition region, the principle of electron density diagnostics are discussed by lines from silicon ion for kappa and Maxwellian distributions. By observed line ratio of the silicon 1440.50 Å to 1445.75 Å lines in quiet sun and active region, the electron density is discussed for any observed line ratio, and results are consistent with reported values in literature. The relationships between line ratio and electron density for the kappa and Maxwellian distributions are also discussed, in the case of lower and higher electron density limits, and results indicate that different distributions have no effect on relationships between the line ratio and the electron density at lower or higher electron density limit. This discussion is significant for accurate electron density diagnostics in the solar transition region, which will be important for study on coronal heating and acceleration of solar wind.

Keywords: Solar transition region, electron density diagnostics, non-Maxwellian distribution.

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