

The Solar Transition Region

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The solar transition region (TR) is the temperature regime from roughly 0.02 MK to 0.8 MK in the solar atmosphere. It is the transition layer from the collisional and partially ionized chromosphere to the collisionless and fully ionized corona. The TR plays an important role in not only the mass and energy transport in the solar atmosphere, but also the initiation of solar eruptions. Most of the TR emission falls into the FUV/EUV range (400Å–1600Å). Imaging and spectroscopic observations in this spectral range are the most important ways to obtain information about the physics of the TR. Static solar atmosphere models predict a very thin TR. However, recent high-resolution observations indicate that the TR is highly nonuniform and magnetically structured. I will summarize some major findings about the TR made through imaging and spectroscopic observations of the SOHO, SDO and IRIS missions. The emphasis will be put on the transition region dynamics above sunspots and in coronal holes. These existing observations have demonstrated that the TR may be the key to understand coronal heating and origin of the solar wind. Future exploration of the solar TR may need to be focused on the upper TR, since the plasma in this temperature regime (~ 0.1 MK–0.8 MK) has never been directly imaged before. High-resolution imaging and spectroscopic observations of the upper TR will not only allow us to track the mass and energy from the lower atmosphere to the corona, but also help us to disentangle various initiation and heating mechanisms of solar flares and coronal mass ejections.