

Temperatures of Extreme-Ultraviolet-emitting Plasma Structures Observed by the Transition Region and Coronal Explorer

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The Transition Region and Coronal Explorer has revealed, in unprecedented detail, various kinds of EUV-emitting plasma structures in the solar upper atmosphere. The filter ratio 195 Å/171 Å has been conventionally used to determine the plasma temperatures, but this method has a shortcoming in that it may not yield a unique temperature value for a given ratio. Therefore, we introduce a new method employing two filter ratios (195 Å/171 Å and 284 Å/195 Å). It is demonstrated that this color-color method is effective in determining a wide range of unambiguous plasma temperatures. We have obtained a temperature of 1×10^6 K for a loop that is bright in 171 Å but hardly visible in 284 Å, a higher temperature of 2×10^6 K for a loop that is clearly visible in 195 and 284 Å but not in 171 Å, and a transition-region temperature of 2.5×10^5 K for a low-lying loop that is clearly visible in all the EUV wavelengths. In addition, we have found that 'moss' structures have temperatures of around 1×10^6 K and that EUV jets have temperatures of about 2.5×10^5 K.