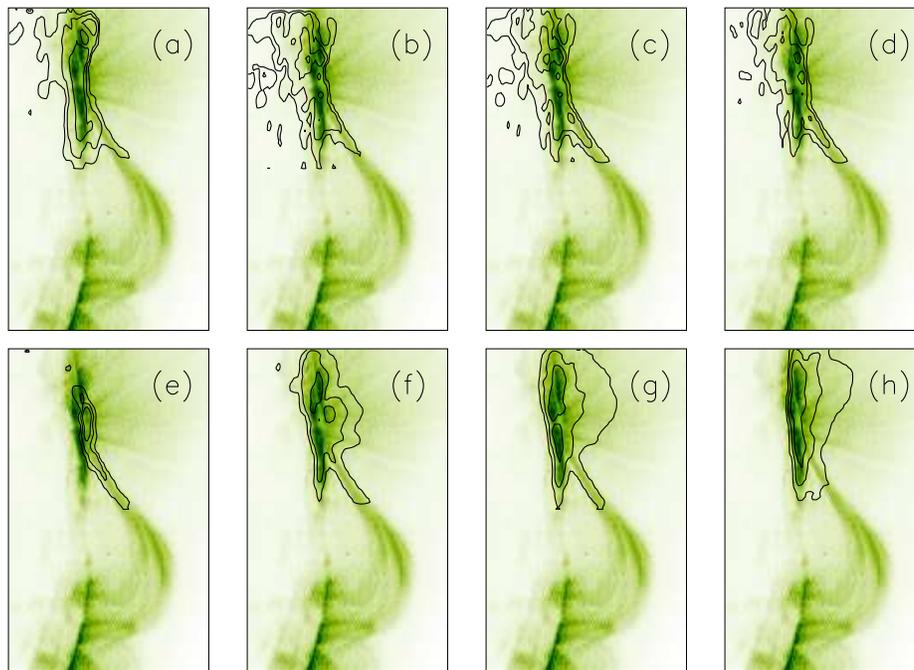


# Composition of & Velocities in a Transequatorial Loop



We observed a transequatorial loop (TEL) connecting Active Regions 10652 and 10653 at the west solar limb on 2004 July 29 with EIT and CDS aboard *SOHO*. Only the loop's northern leg was observed with CDS. The loop appeared bright and cospatial in EUV emission lines from ions formed over a wide range of temperature ( $T$ , in K) including  $\text{Fe}^{+11}$  (Fe XII,  $\log T = 6.1$ , the  $5' \times 8'$  image in frames [a]-[h] above), (a) He I ( $\log T = 4.0$ ; displayed as contours), (b) O III (4.9), (c) O IV (5.2), (d) O V (5.4), (e) Ne VI (5.6), (f) Ca X (5.9), and (g) Mg X (6.1); it does not appear as distinct in (h) Si XII (6.3). This indicates that the loop plasma was multithermal, and covered roughly two orders of magnitude in temperature. Our measurement of He I, O III, and O IV line emission reveals the coolest plasma ever detected in a TEL. The most likely explanation for the wide range of cospatial temperatures in the TEL is that it consisted of numerous sub-resolution strands, all at different temperatures. Each of the lines formed at temperatures less than  $10^6$  K exhibited relative Doppler blueshifts in the TEL that corresponded to velocities toward the observer larger than  $30 \text{ km s}^{-1}$ , where the two strongest cool lines (He I at  $584.3 \text{ \AA}$  and O V at  $629.7 \text{ \AA}$ ) yielded maximum values of  $37$  and  $41 \text{ km s}^{-1}$ , respectively. The presence of cool plasma in the TEL at heights several times those of the cool ions' scale heights suggests that the loop maintained a steady flow of cool plasma in order to remain visible at the low temperatures. [From J. W. Brosius, *The Astrophysical Journal (Letters)*, vol. 636, p. L57 (2006 January 1).]