SA-O7

How the solar corona is heated to multi-million Kelvins remains unsolved in solar physics. In this study we analyze observations of 50 entire active region loops taken with the Extreme-ultraviolet Imaging Spectrometer on board the Hinode satellite. Eleven loops were classified as cool loops (<1 MK) and 39 as warm loops (1–2 MK). We study their plasma parameters, such as densities, temperatures, filling factors, nonthermal velocities, and Doppler velocities. We combine spectroscopic analysis with linear force-free magnetic field extrapolation to derive the 3D structure and positioning of the loops, their lengths and heights, and the magnetic field strength along the loops. We use density-sensitive line pairs from Fe xii, Fe xiii, Si x, and Mg vii ions to obtain electron densities by taking special care of intensity background subtraction. The emission measure loci method is used to obtain the loop temperatures. We find that the loops are nearly isothermal along the line of sight. Their filling factors are between 8% and 89%. We also compare the observed parameters with the theoretical Rosner–Tucker–Vaiana (RTV) scaling law, finding that most of the loops are in an overpressure state relative to the RTV predictions. We will also discuss potential ways for exploiting this rather large ensemble of measurements to understand the structuring and heating of coronal plasmas.