Coronal dynamics and heating theories

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The solar corona has been modeled as a collection of single hydrostatic loops and as a hydrostatic plane parallel atmosphere but these models have had serious problems reproducing the observations made of the solar corona. The favored coronal heating models rely on large gradients in wave speed for AC models and gradients in the magnetic field for DC models and both provide an energy release that has no reason to be uniform across the magnetic field and so the heating function at play in the solar corona is most likely intermittent in both space and time and we must therefore embrace a dynamic model of the corona. This conclusion is supported by high cadence, high resolution observations of the chromosphere and transition region, which show a very dynamic atmosphere. I will concentrate on a 3D MHD simulation of the solar atmosphere from the photosphere to the low corona, and will show that even for a quiescent active region and even though the observed intensity of the loops is close to constant, the loops are not in a static equilibrium. The corona is very dynamic and images made from the simulation of doppler shifts show much more time dependence and intermittency than does images showing only intensity.