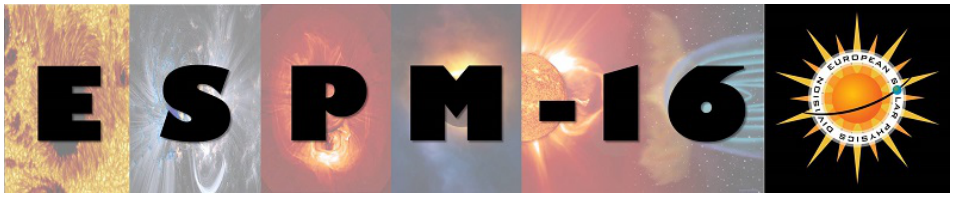

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The Missing Cool Corona in the Flat Magnetic Field Around Solar Active Regions

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SDO/AIA images the full solar disk in several EUV bands that are each sensitive to coronal plasma emissions of one or more specific temperatures. We observe that when isolated active regions (ARs) are on the disk, full-disk images in some of the coronal EUV channels show the outskirts of the AR as a dark moat surrounding the AR. We will present several specific examples, selected from time periods when there was only a single AR present on the disk. Visually, moats are observed to be most prominent in the AIA 171 Angstrom band, which has the most sensitivity to emission from plasma at log10 T = 5.8. By using the emission measure distribution with temperature, we find the intensity of the moat to be most depressed over the temperature range log10 T ~ 5.7 - 6.2 for all the cases. We argue that the dark moat exists because the pressure from the strong magnetic field that splays out from the AR presses down on underlying magnetic loops, flattening those loops – along with the lowest of the AR's own loops over the moat – to a low altitude. Those loops, which would normally emit the bulk of the 171 Angstrom emission, are restricted to heights above the surface that are too low to have 171 Angstrom emitting plasmas sustained in them, while hotter EUV-emitting plasmas are sustained in the overlying higher-altitude long AR-rooted coronal loops. This potentially explains the low-coronal-temperature dark moats surrounding the ARs.

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