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Multi-temperature solar jets and emerging flux MHD models

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Hot coronal jets are a basic observed feature of the solar atmosphere whose physical origin is still actively debated. We study recurrent solar jets that occurred in active region NOAA 12644 on April 4, 2017. They are observed in all the hot filters of AIA as well as cool surges in IRIS slit–jaw high spatial and temporal resolution images. A fine co-alignment of the AIA and IRIS data shows that the jets are initiated at the top of a canopy-like double-chambered structure with cool emission on one and hot emission on the other side. The hot jets are collimated in the hot temperature filters, have high velocities and are accompanied by cool surges and ejected kernels. This series of jets and surges provides a good case study for testing the 2D and 3D magnetohydrodynamic emerging flux models. The double-chambered structure that is found in the observations corresponds to the regions with cold and hot loops that are in the models below the current sheet that contains the reconnection site. The cool surge with kernels is comparable with the cool ejection and plasmoids that naturally appears in the models.