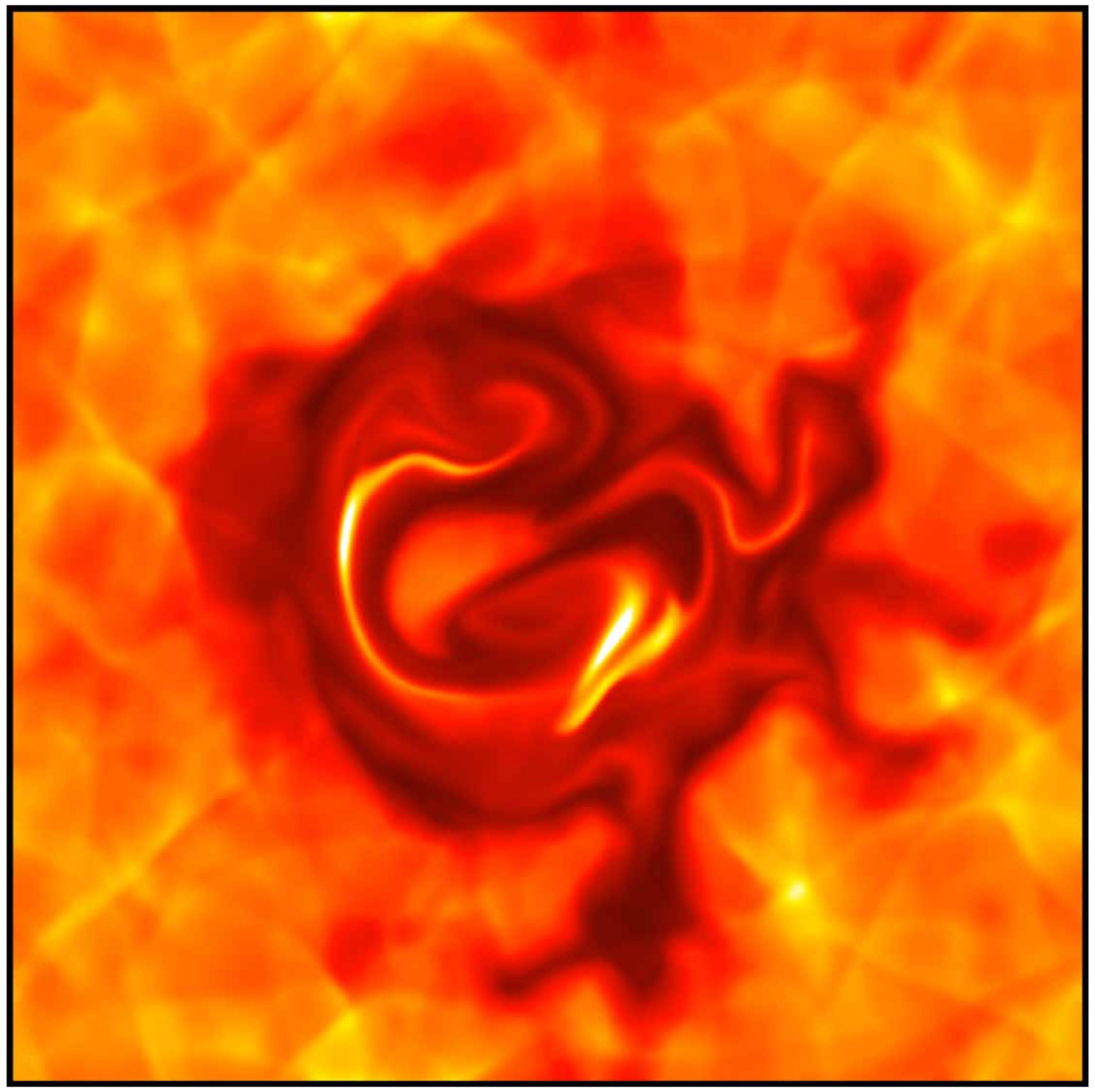
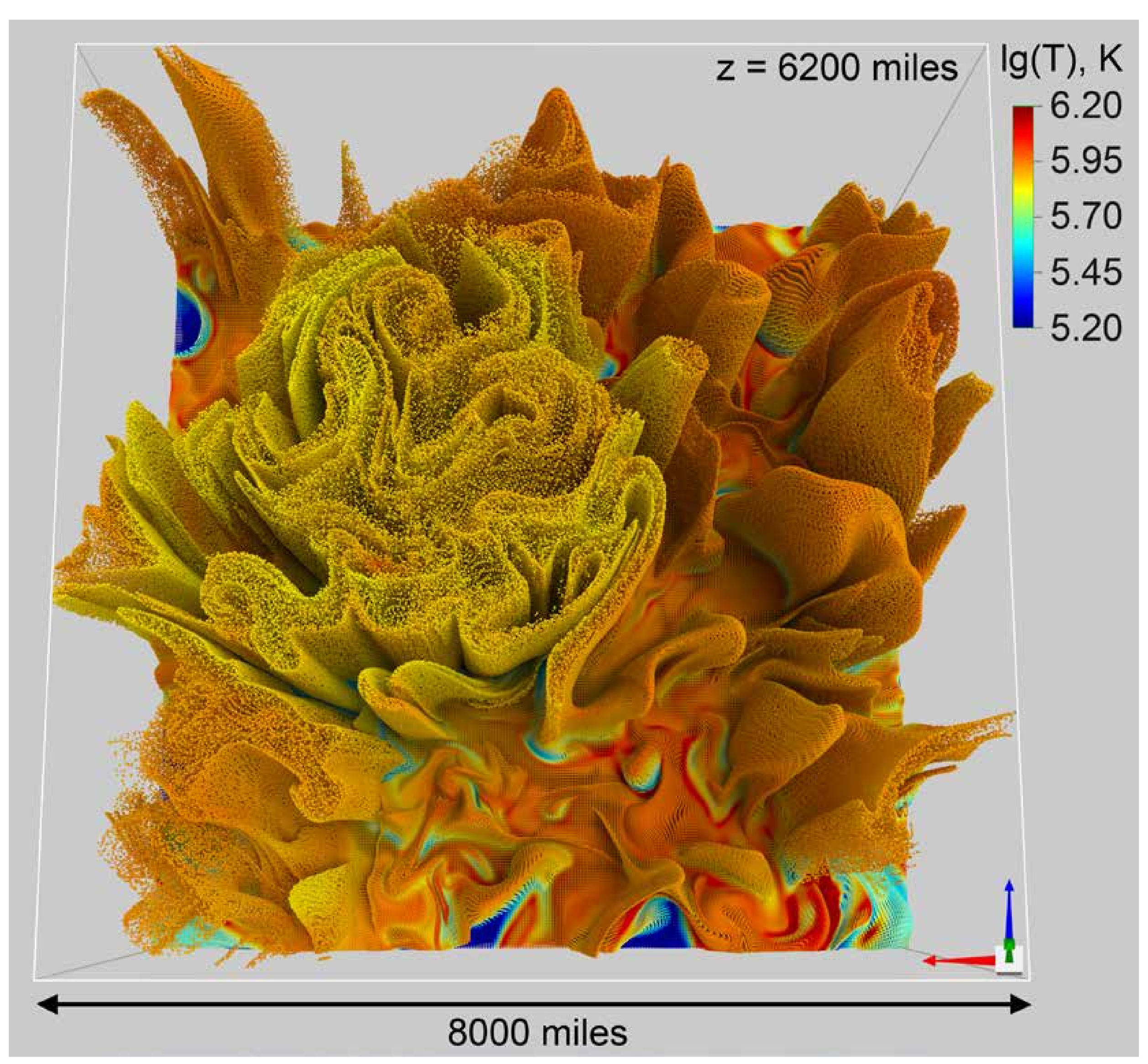


Temperature structure of the solar corona at a height of 6,200 miles above the solar surface. This image shows regions of strong plasma heating to several million degrees Kelvin (yellow-white colors), caused by the dissipation of small-scale electric currents spontaneously generated in the magnetic structure (center) as well as by shocks propagating across the solar atmosphere. *Irina Kitiashvili, Timothy Sandstrom, NASA/Ames*



View of a coronal structure from the top of the computational domain, revealed by tracking particle motions. Simulation results show a self-formed magnetic structure that originates from a kilogauss magnetic field patch in the photosphere and extends through the chromosphere and transition zone into the corona. Red show regions where the solar plasma is heated above 1 million degrees Kelvin. Visualizations are performed by advecting particles seeded at 1,400 miles above the solar surface. *Irina Kitiashvili, Timothy Sandstrom, NASA/Ames*

National Aeronautics and
Space Administration

Modeling the Solar Corona to Study Sources of Space Weather Disturbances

Solar coronal activity is the primary source of space weather disturbances. Realistic modeling of the corona is critical for understanding the origins of space weather and predicting the impacts of solar activity on the near-Earth space environment. Resolving the mystery of coronal energy sources is a cornerstone for building reliable forecasts of high-energy solar radiation and particle fluxes. We have performed 3D radiative magnetohydrodynamic simulations that reproduce the structure and dynamics of the solar corona. This study helps us understand energy accumulation and release in the solar atmosphere and interpret observations from NASA's Solar Dynamics Observatory, IRIS, and Hinode missions; and helps prepare for the Artemis Program and human space exploration beyond low-Earth orbit.

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