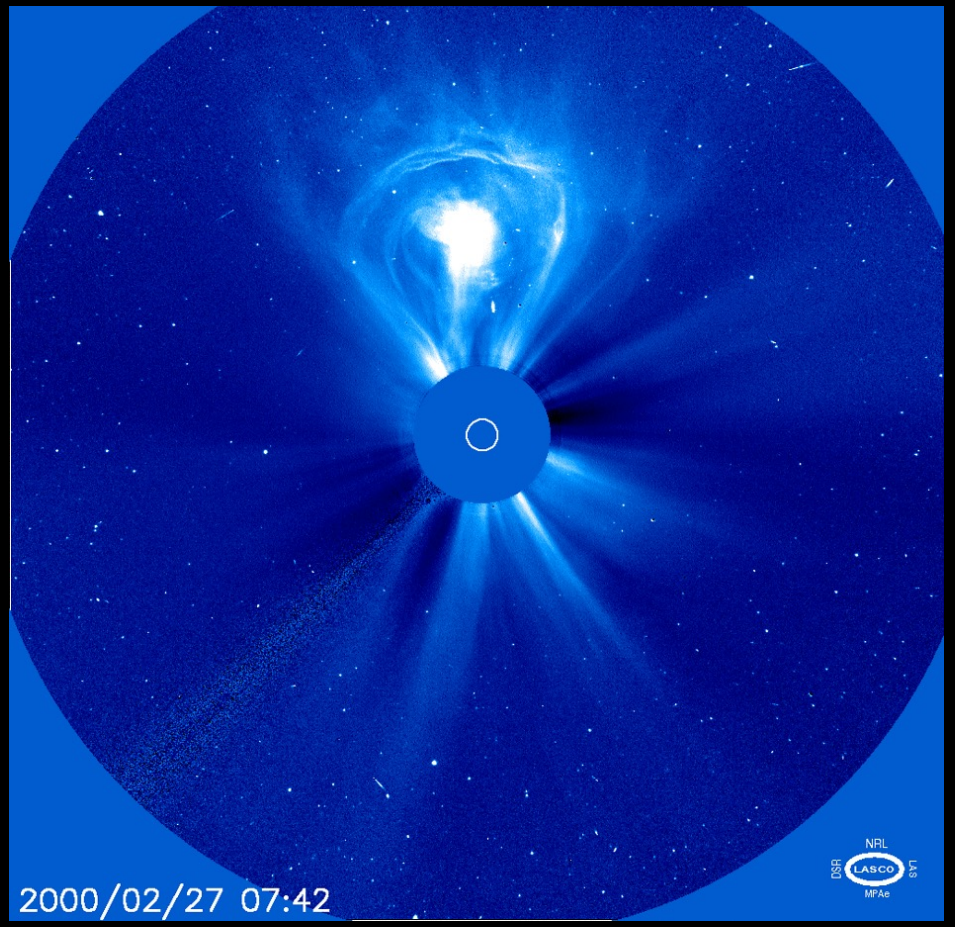
More Realistic CME Model Leads to Better Space Weather Predictions

Coronal Mass Ejections (CMEs) are billion-ton structures of solar material and magnetic fields that erupt from the Sun. They are major components of space weather and can have a host of impacts on the solar system. At Earth, they can disrupt communications, negatively impacting space travel, and in the most extreme cases disrupt our power grids. It is important to have accurate physical models in order to track and ultimately predict their impact.

One commonly-used model of CME structure resembles a croissant (the curved pastry). The problem is these structures have a limited ability to realistically model the twisting and deforming of CMEs as they travel through space and interact with the background solar wind. Researchers at Goddard have developed a new model that is more like a rope that can curve and bend in the environment the CME travels through.

The new model has been shown to provide a more accurate description of CMEs which will lead to more accurate predictions. This will better help NASA and its partners protect our assets, technological infrastructure, and space travel from the impacts of space weather from the Sun.



An image of a coronal mass ejection captured by the NASA/ESA SOHO mission.

Weiss, Andreas (NPP/672), Nieves-Chinchilla, Teresa (672), Reiss Martin (CUA/674), 2022: "Writhed analytical magnetic flux rope model," JGR Space Physics: https://doi.org/10.1029/2022JA030898.