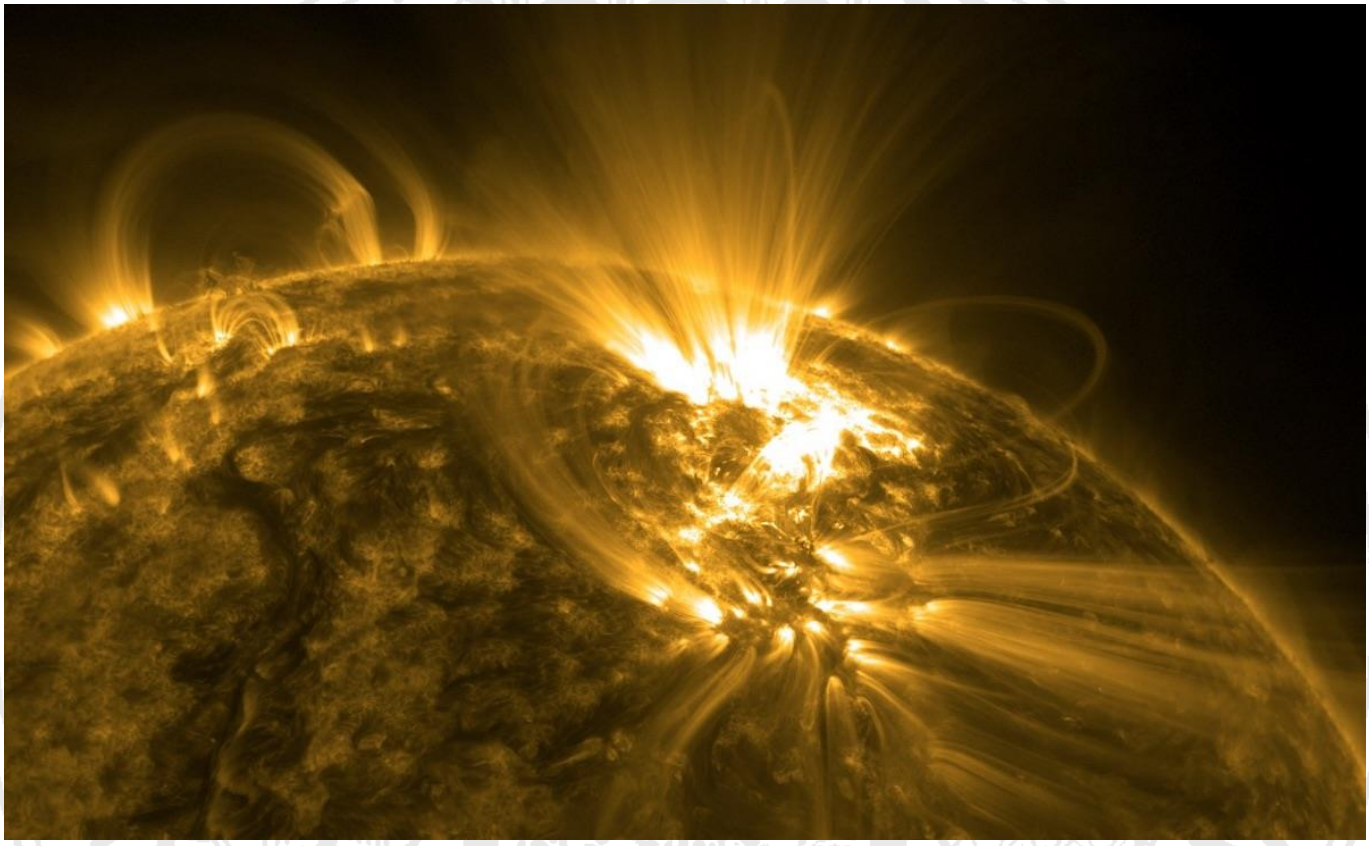
UNI FREIBURG
Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

SONDERKOLLOQUIUM

AM 12. JULI 2022 UM 16:15 UHR, HÖRSAAL 1



The corona of the Sun seen at 17.1 nm showing plasma at about one million Kelvin. Data courtesy of AIA/SDO/NASA

The magnetic solar atmosphere

PROF. DR. HARDI PETER
MAX-PLANCK-INSTITUT FÜR SONNENSYSTEMFORSCHUNG, GÖTTINGEN

During a total solar eclipse, the Sun shows a crown of hot gas that forms its outer atmosphere. This is the corona, where temperatures reach one million Kelvin and more. Modern observations show that this plasma is structured by the magnetic field. Changes in the magnetic field drive transient events and eruptions. The most energetic of these events can escape the gravity of the Sun, might hit the Earth's magnetosphere, and cause polar lights or disruptions in satellite communication. To identify what causes these transient events, we have to understand the origin, dynamics, and evolution of the (small-scale) magnetic field in the lower solar atmosphere. We need to know how the magnetic field transports and dissipates the energy, and we need to be able to describe how this impacts the plasma in the upper atmosphere. These processes have been clearly illustrated by recent results that combined observations from the visible, near-infrared, and extreme-ultraviolet with 3D numerical models of the solar atmosphere. New instrumentation that is being developed and advances in numerical modeling give us confidence that some of the longest-standing puzzles in solar astrophysics can be solved within the next decade. This even includes understanding the mechanism with which the cool Sun heats the hot corona that surrounds it.