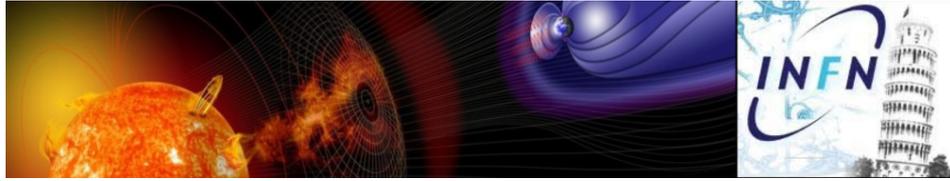


RHESSI-20 Workshop: Preparing for the Next Decade in High-Energy Solar Physics Research



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The COMPLETE mission concept for the Heliophysics Decadal Survey

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It is commonly accepted that impulsive solar eruptions (flares/CMEs) and more gradually-evolving energetic processes (coronal heating, solar wind outflows) are powered by the Sun's complex coronal magnetic field. However, despite many decades of research, it is still poorly understood exactly how magnetic energy is stored and impulsively released to power plasma heating, particle acceleration, and bulk flows in these phenomena. One of the largest gaps preventing a deeper understanding of these processes is the lack of knowledge of the 3D coronal magnetic field and its evolution.

We present the Co-Optimized Multi-Perspective Loop/Eruption Tracing and Energetics (COMPLETE) mission concept, currently under study for the upcoming Heliophysics Decadal Survey. COMPLETE would provide the *first* comprehensive measurements of the 3D low-coronal magnetic field *and* simultaneous 3D energy release diagnostics, from large eruptions (flares and CMEs) down to small-scale processes (coronal heating and solar wind outflows). COMPLETE's measurements of the 3D field evolution and corresponding energy release diagnostics will finally allow closure on the long-standing question of exactly how energy is stored, released, and transported in impulsive events at all scales.

COMPLETE comprises an instrument suite with hard and soft X-ray spectral imagers, gamma-ray and energetic neutral atom spectral imagers, high-resolution wide-field EUV filtergram imagers, photospheric Doppler vector magnetographs, and Hanle-effect UV (Ly- α) coronal magnetographs. Distributed across three spacecraft at the L1, L4, and L5 Earth-Sun Lagrange points, the suite on each spacecraft is optimized for the measurements from that vantage point and for the mission as a whole. Data from all instruments will be processed to enable systems-level analysis from the entire observatory.

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