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Kink-and-Disconnection Failed Eruption in 3D

We report the first stereoscopic observations of HXR emission sources registered by STIX onboard Solar Orbiter and HXI on ASO-S. This is a case study of a two-stage failed eruption. First, it was slowed down due to a helical kink. However, the legs of the kinked structure started to reconnect and the second stage of eruption started. This eruption failed a few minutes later due to reconnection below the magnetic flux rope and confinement by overlying magnetic fields. We identified three X-ray sources located in the corona which are related to the reconnection sites and the magnetic cloud confined by overlying fields. Combining stereoscopic X-ray observations from STIX and HXI (31.5 degrees vantage point separation) with Differential Emission Measure (DEM) maps based on SDO/AIA observations we were able to locate X-ray source sites in the corona in the 3D space. The unveiled real geometry allowed us to estimate de-projected values of velocity and acceleration/deceleration which are extremely high. Moreover, real locations of HXR sources are not fully consistent with a standard solar flare scenario.

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