ERUPTION OF A MULTI-FLUX-ROPE SYSTEM IN SOLAR ACTIVE REGION 12673 LEADING TO THE TWO LARGEST FLARES IN SOLAR CYCLE 24

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Magnetic flux rope is a set of magnetic field lines winding around a central axis and is closely connected with solar eruptions, such as flares and coronal mass ejections. The classical scenario assumes a single flux rope for each eruption, but it is reasonable to expect multiple flux ropes in a complex active region (AR). Recently, AR 12673 in 2017 September produced the two largest flares in Solar Cycle 24: the X9.3 flare on September 6 and the X8.2 flare on September 10. The evolutions of the AR magnetic fields and the two large flares reveal that significant flux emergence and successive interactions between the different emerging dipoles resulted in the formations of multiple flux ropes and twisted loop bundles, which successively erupted like a chain reaction within several minutes before the peaks of the two flares. We propose that the eruptions of a multi-flux-rope system rapidly released enormous magnetic energy and resulted in the two largest flares in Solar Cycle 24.