Observational Signatures of CME Initiation and Eruption: Does Flux Rope Exist Prior to the Eruption?

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We present detailed observational studies of two contrasting eruptive events, one resulting in a CME and the other a failed eruption. We argue that a magnetic flux rope (MFR) has already formed before the eruption. The magnetic flux rope revealed itself as a hot EUV channel (~10 MK) in SDO/AIA 131 A passband. It initially appeared as a sigmoidal structure with two ends rooted in the photosphere, minutes before the onset of the accompanying flare. The hot channel was not visible earlier in time, probably due to its low temperature before it was activated. The rise of the central portion of the sigmoid led to the formation of a semi-circular-shaped flux rope. The flux rope then entered into the impulsive acceleration phase accompanied at the same time by the flare energy release. Similar evolution was observed in the case of failed eruption, except that the impulsive acceleration was quickly quenched by the overlying magnetic field. Morphological, kinematic and thermal evolutions of these events will be presented. The theoretical implications will be discussed.