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# The contraction of overlying coronal loop and the rotating motion of a sigmoid filament during its eruption

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## Abstract

We present an observation of overlying coronal loop contraction and rotating motion of the sigmoid filament during its eruption on 2012 May 22 observed by Solar Dynamics Observatory (SDO). Our results evidenced that the twist can be transported into the filament from the lower atmosphere to the higher atmosphere. The successive contraction of the coronal loops was due to a suddenly reduced magnetic pressure underneath the filament, which was caused by the rising of the filament. Before the sigmoid filament eruption, there was a counterclockwise flow in the photosphere at the right feet of the filament and the contraction loops and a convergence flow at the left foot of the filament. Moreover, two coronal loops overlying the filament first experienced brightening, expansion and contraction successively. At the beginning of the rising and rotation of the left part of the filament, the second coronal loop exhibited rapid contraction. The top of the second coronal loop also showed the counterclockwise rotation during the contraction process. During the filament expansion, the right part of the filament also exhibited the counterclockwise rotation like a tornado. The magnetic helicity in the photosphere was calculated by using LCT method.

**Keywords:** filaments, prominences, activity, magnetic topology

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