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# Filaments Evolution and Flare in NOAA AR 11589

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## Abstract

Here, we present the dynamics of the filaments in NOAA AR 11589 and of the flare on 16 October, 2012. For this study, we used the multi-wavelength high resolution data from the Solar Dynamic Observatory (SDO) as well as THEMIS and ARIES, Nainital, India ground based observations. In the active region (AR), we follow the evolution of two filaments and observe the northern footpoint of both filaments coming closer to each other as time progresses but without merging. We derive the chirality of the filaments and find that both filaments have opposite chirality which, in this configuration, may have prevented them from merging. On 16 October 2012, we also observe a C3.3 class flare in the AR. At the flare location we notice the motion and cancellation of magnetic polarities. The flare occurred without eruption of the filaments present in the AR. According to the standard solar flare model, after the reconnection, the post flare loops form below the filaments. However, in our observations, we see the formation of post flare loops above the filaments, which is not consistent with the standard flare model. We perform linear force-free extrapolation and compute the quasi-separatrix layers (QSLs). The results show that the photospheric QSLs footprints matches the flare ribbons locations. We discuss how slipping or slip-running reconnection at the QSLs may explain the observed dynamics.

**Keywords:** Active regions, Filaments, Flare, dynamics, Magnetic Reconnection, Observational signatures

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