

# Observational study of the relationship between solar filament eruption and photospheric magnetic field

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The filament in the solar corona may erupt and forms a coronal mass ejection (CME) which can disturb the magnetosphere of the Earth and cause the geomagnetic storm. Therefore, it is important to understand the condition of filament eruption. Although filament eruption can occur both in the active and quiet regions of the solar surface, the mechanism of filament eruption in the quiet region is more elusive because the intensity of magnetic field is much weaker than the active region. In this paper, to improve our understanding of the onset mechanism of filament eruption in the quiet region, we analyze the relationship between the structure of filament and photospheric magnetic field. We use the data of Ha line image of a filament observed by SMART/SDDI at Hida Observatory and photospheric magnetic field observed by Helioseismic and Magnetic Imager (HMI) onboard Solar Dynamics Observatory (SDO). As a result of the analysis of a small filament, which erupted on April 23, 2017, we found that the positive and negative magnetic patches located on both sides of the filament were approaching each other before the eruption. The result suggests that the evolution of photospheric magnetic field is responsible for the filament eruption also in the quiet region. We will discuss the similarity and difference of filament eruption between the active quiet regions based on the observational results.

Keywords: Solar filament eruption