

# Large Amplitude Oscillation of a Polar Crown Filament in the Pre-Eruption Phase

HIROAKI ISOBE<sup>1</sup>, DURGESH TRIPATHI<sup>2</sup>

<sup>1</sup>*Department of Earth and Planetary Sciences, University of Tokyo*

<sup>2</sup>*Department of Applied Mathematics and Theoretical Physics, University of Cambridge*

We report the observation of a large amplitude filament oscillation followed by the eruption. The filament oscillation was observed in EUV by Extreme-Ultraviolet Imaging Telescope on board SOHO satellite and in H alpha by the Flare Monitoring Telescope at Hida Observatory. The filament clearly exhibited oscillatory motion in the slow-rising, pre-eruption phase. The amplitude of the oscillation was larger than 20 km/s, and the motion was predominantly horizontal. The period was about 2 hours and seems to increase during the oscillation. These results indicate that even in the slow-rise phase before the eruption the filament retained equilibrium and behaved as an oscillator, and the equilibrium is stable for nonlinear perturbation. The transition from such nonlinear stability to instabilities or loss of equilibrium that lead to the eruption occurred in the Alfvén time scale. This suggests that the onset of the eruption was triggered by fast magnetic reconnection that stabilized the pre-eruption magnetic configuration, rather than the slow shearing motion at the photosphere.