Magnetic field diagnostic of solar filaments with spectropolarimetric observations in He I 1083nm

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Solar filaments are dense cool plasma in the solar corona. They are supported in a dip of coronal magnetic field. There are two classical models of magnetic field configuration of solar filaments; one is the normal polarity model proposed by Kippenhahn Schlueter (1957), and the other is the reverse polarity model proposed by Kuperus Raadu (1974). These two models are identified by the tilt direction between the magnetic field of the filament and polarity inversion line (PIL). To understand the mechanism that makes filaments unstable before their eruptions and/or solar flares, it is critical to confirm the magnetic field configuration of solar filaments. Previously, we have performed the He I 1083 nm spectropolarimetric observation targeting on quiet sun filaments with the Domeless Solar Telescope at Hida Observatory. We found that the magnetic field strength was 8-35 G and majority of the magnetic field configuration was reverse polarity (Yamasaki et al. 2023). In this study, we performed the same observation but targeting on an active region filament, which appeared in AR NOAA 13092 on September 5, 2022. The observation was carried out one hour after C class flare. As a result of our analysis of full Stokes profiles, we found the followings: deviation of the filament position from the PIL of about 10000 km, magnetic field strength of the filaments of 101±33 G, and counter-streaming flow along the filament axis with about 10 km/s. By comparing the direction of the magnetic field in filaments and the global distribution of the photospheric magnetic field, we suggested that the magnetic field configuration of the filament was intermediate of the two classical models, i.e., magnetic field of the filament was almost parallel to the PIL. In our presentation, we will also discuss the interpretation of strong Zeeman-like Stokes profiles found in linear polarization, and disambiguation method in our Stokes inversion.