

PROPER MOTION OF CYG LOOP FILAMENTS

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We determine the shock velocities in the Cygnus Loop supernova remnant (SNR), using proper motions of the associated filaments. The proper motions are measured by comparing the H α images of the SNR observed in two epochs: in 1993 (obtained at Kitt Peak National Observatory), and in 2018 (our observations obtained at National Astronomical Observatory Rozhen, Bulgaria). The shock velocities are derived using the most recent distance estimate of Cygnus Loop (735 ± 25 pc), based on Gaia DR2 parallax measurements. The velocities of both nonradiative and radiative filaments are obtained and compared. The radiative filaments are selected because they are visible, while nonradiative are not visible in [SII] images of the SNR. Additionally, we use XMM-Newton observations of Cygnus Loop parts (Obs. ID 0741820101, PR Brian Williams; Obs. ID 0082540101, PR Emi Miyata) for comparison of the optical and X-ray properties of targeted filaments.