

Short-term variability observation with the Yamaguchi Interferometer

Kenta Fujisawa⁽¹⁾

(1) Yamaguchi University, Yamaguchi, Japan; e-mail: kenta@yamaguchi-u.ac.jp

The Yamaguchi interferometer (YI) is a single-baseline interferometer consisting of two radio telescopes of 32 m and 34 m^[1]. The baseline length is 108 m and the observation frequencies are 6 GHz and 8 GHz. The detection sensitivity for continuum source is as high as about 2 mJy. We, the research group of Yamaguchi University, operate the YI, so it is easy to observe flux variability of radio sources using a long observation time. We mainly use the YI for monitoring observation of fast variable radio sources.

In this paper, we report an observation results of the radio variability of a cataclysmic variable star AE Aqr using the YI. AE Aqr is one of the cataclysmic variables and is classified as a DQ Her type. This type is thought to be a white dwarf with a strong magnetic field of $10\text{-}10^3$ T interacting with the accretion disk and accreting gas.

AE Aqr has two distinguishing features. One is the fastest rotation among white dwarfs. The period is $P = 33$ sec. The other is that it has the strongest radio emission of any white dwarf binary. The flux density at 8 GHz is about 10 mJy, and it is known that the flux density fluctuates in a short time.

Our final goal is to reveal the radio emission mechanism of AE Aqr. In this study, we aimed to detect short-term flux variability reported in previous studies using the YI.

Observations were made on June 5, 2021 (MJD 59735) from 15:00-23:00 UT. The observation frequency is 8448 MHz. As a result of the observation, the fluctuation of the flux density was observed in the range of 3 - 23 mJy. Three distinct peaks (flares) were observed. In the third flare, the ascent and descent of the flare was completed in a short period of 30 minutes (Figure 1).

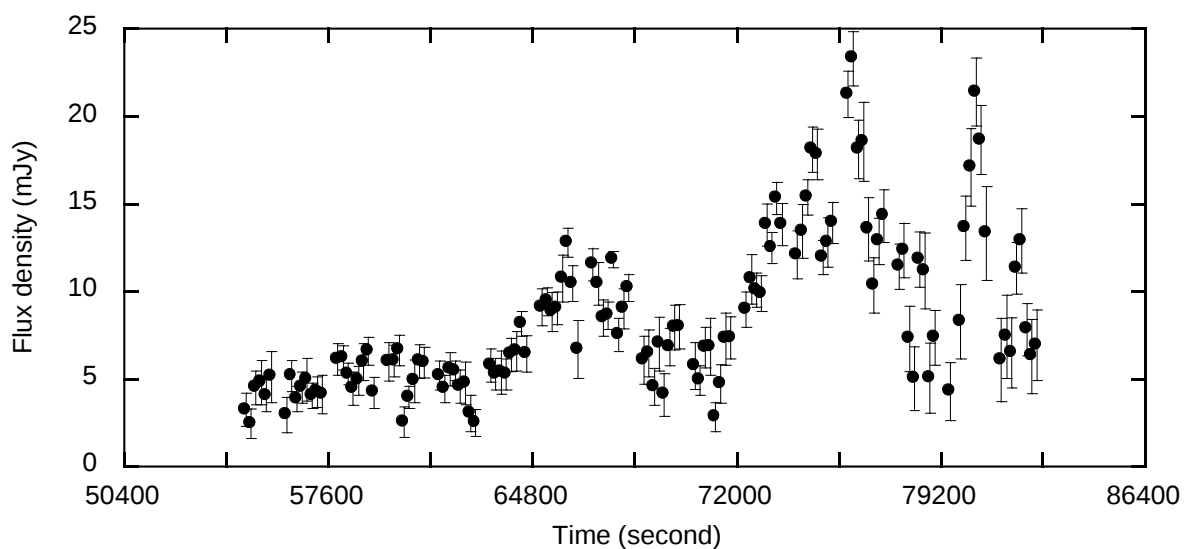


Figure 1. Radio light curve of AE Aqr at 8.4 GHz (MJD 59735) observed by the YI. The flux density varied rapidly.

References

- [1] Kenta Fujisawa et al., “The Yamaguchi Interferometer” *Publications of the Astronomical Society of Japan*, Volume 74, Issue 6, pp.1415-1420 (2022), doi: 10.1093/pasj/psac078.