Proper motion of the radio pulsar B1727−47 and its association with the supernova remnant RCW 114

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PSR B1727−47 was discovered in 1968 and is one of the brightest radio pulsars known. It is relatively young with characteristic age of 80 kyr, DM distance of 2.7 kpc, and spindown-estimated magnetic field of 1.2×10^{13} G. Despite a long observational history, the proper motion of PSR B1727−47 has never been reported due to a large timing noise and regular glitching behavior. We mad timing analysis of more than 20 yr of Parkes archival observations as well as ATCA archival radio-iterferometric observations made in 2004 and 2011. In addition, we conducted original observations with ATCA in September 2016. As a aresult, we for the first time measured a substantial proper motion of PSR B1727−47 at the level of 150 ± 20 mas yr^{-1}. For a DM distance of 2.7 kpc this transform to a record transverse velocity of 1700 km s^{-1}. However, pulsars projects on the edge of a large Galactic supernova remnant RCW 114 and the backward extrapolation of the obtained proper motion vector points right towards the center of the remnant. This strongly suggests a genuine association between the two objects. Detailed analysis of multiwavelength appearance of RCW 114 suggests that the distance to the system pulsar+remnant is in fact much smaller than the DM distance, an is in the range $0.7 - 1$ kpc. A lower distance to the pulsar points to a possibility of its X-ray observations.

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