MAGIC

Science of the Cosmos

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Studying the Kick Velocity Model during the Formation of Binary Pulsars

The kick velocity that arises during the binary interaction plays a vital role in determining the fate of binary pulsars. This work aims to explore the evolutionary link between the final orbital parameters of binary systems where one of the components experiences a mass change and a kick is imparted. Our study suggests that variations in the orbital period distributions can be explained by a kick velocity model resulting from the dynamical effects of an accretion induced collapse (AIC) of white dwarfs. Our model predicts that, 23% of binary pulsars in the Galactic disk with orbital periods POrb1 ≥ 2 are relevant for the pre-AIC orbital process. This implies that the kick velocity that arises during the AIC process plays a crucial role in disrupting or surviving the binary pulsars. The results of this study provide insight into the dynamics of binary pulsars and the role of kick velocities in their evolution.

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