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Possible Dark Matter Signals from White Dwarfs

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In our galaxy, the white dwarfs (WDs) will inevitably capture the dark matter (DM) particles streaming through them, if there exist interactions between DM particles and nuclei/electrons. At the same time, these DM particles can also be evaporated by the nuclei/electrons in a WD if they have proper mass and the WD is not too cold. The evaporation of DM particles will lead to a faster cooling evolution than that predicted by the stellar evolution theory.
In this work, we ascribe the faster cooling evolution of three observed WDs to the capture and evaporation of DM particles, and get the possible regions of DM particle's mass and DM-electron cross section.
The results are beyond the detection capabilities of current direct detection experiments and shouldbe cross checked by more novel scenarios in the future.

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