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Realising Dark Matter and NANOGrav data via Dark Branes

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In this work we propose a setup for the origin of dark matter based on spacetime with a warped extra dimension and three branes: the Planck brane, the TeV brane and a dark brane, at a (sub)-GeV scale. The Standard Model is localized in the TeV brane, thus solving the Higgs hierarchy problem, while the dark matter χ, a Dirac fermion, is localized in the dark brane. The dark matter has only gravitational interactions with the Standard Mode and we show that it can easily reproduce the thermal relic density by annihilations into radions and avoid direct detection experiments. The dark brane comes with a conformal sector confining at a 1st order phase transition generating a stochastic gravitational waves background which can accommodate the recent NANOGrav signal. A region in the parameter space of dark matter and radion masses is selected.

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