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Warp drives in scalar-tensor theories

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Spacetime configurations corresponding to warp drives allow observers to traverse distances faster than the speed of light without violating the postulates of special relativity. Although appealing for space travel, it has been shown that warp drives in general relativity require exotic matter that violates energy conditions. Cosmological observations bring out the shortcomings of general relativity due to which many modified theories of gravity have been proposed. In this talk we explain how to build upon the previous results in general relativity and study warp drives in scalar-tensor theories of gravity in order to find whether warp drives are possible without introducing ghost fields or exotic matter. We present first steps in solving the problem by mapping out a tree of solutions based on various assumptions. Considering additional assumptions we analyse the branches of the tree and the physical problems that arise.

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