In this article the authors study scattering amplitudes of gravitons in 4-dimensional curved spacetimes. The spacetime under study is called the self-dual radiative spacetime and has some suitable features such as self-duality and asymptotic flatness which provide a useful setup in the analysis of gauge fields in twistor space. In [1] scattering amplitudes of gluons has been investigated in the self-dual radiative spacetime by the same authors. This article under review can be considered as a gravitational and curved version of the reference [1].

Another important knowledge one needs to have to fully appreciate this article is the result of tree-level graviton scattering amplitudes in flat background, utilizing the MHV (or Maximally Helicity Violating) amplitudes as basic ingredients for the computation in twistor space [2, 3, 4]. The authors calculate the graviton MHV amplitudes in the curved spacetime and present new features such as tail terms which come from interactions between gravitons and the background curvature.

The authors show that the resultant graviton MHV amplitudes in the self-dual radiative background reproduce the previously obtained MHV amplitudes [5] when the backgrounds are given by self-dual plane waves. The authors also apply the results to non-MHV amplitudes and present a conjectural form. These results would be useful for future studies of formal and practical aspects of quantum gravity.

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