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Gravitational Waves in $F(R)$ Gravity

We explore the formulation of Gravitational Waves (GWs) in the modified $f(R)$ gravity model given by $f(R) = \frac{R^{1+\delta}}{\delta}$. We introduce the weak field approximation and study polarization of GWs. The Gravitational Waves carry an extra mode of polarization beyond the TT mode for the weak field approximation. We discuss the dependence of the polarization of these waves on the scalaron mass and effective potential.

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