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## Preheating in the Universe: Einstein-Jordan frame correspondence

Cosmological observations indicate that the Universe underwent an inflationary phase in the very early stages of evolution, which lead to its supercooled state. Then, to again heat up the Universe and generate particles, there was a phase of preheating and/or reheating, the exact description of which depends on the particle physics model and the interaction Lagrangian. In contrast to this, the preheating phase can also be explained as an effect of modified gravity, by coupling the matter fields non-minimally to the gravity sector. In this study, we build a relationship between the Einstein and Jordan frame Lagrangian, in order to explain the parametric resonance effect needed for preheating. We consider different forms of potential with a parametric resonance term in the Einstein Frame and its correspondence to a non-trivial  $f(R)$  and conformal-like coupling in the Jordan Frame. This study is a first step towards building an important relationship between the two frames that will allow further investigations on the production of primordial gravitational waves and black holes during preheating

### Field of contribution

Theory

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