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Towards $SO(10)$ GUT Inflation Models with Gravitational Waves from Cosmic Strings

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In this work, we construct promising model building routes towards $SO(10)$ GUT inflation. We consider a supersymmetric framework within which the so-called doublet-triplet splitting problem is solved without introducing fine-tuning. Additionally, realistic fermion masses and mixings, gauge coupling unification, and cosmic inflation are incorporated by utilizing superfields with representations no higher than the adjoint representation. Among the three possible scenarios, two of these cases require a single adjoint Higgs field. In contrast, the third scenario consisting of two adjoints, can lead to observable gravitational waves from cosmic strings that are within reach of several ongoing and upcoming gravitational observatories.

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