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Scalar and tensor perturbations in non-canonical scalar model YOUSEF IZADI, University of Massachusetts Lowell, AMIN REZAEI AKBARIEH, MOHAMMAD AHMADI, University of Tabriz, SHAHABEDDIN M. ASLMARAND, Florida Atlantic University — The non-canonical scalar model is one of the interesting models in the class of scalar-tensor theories. This model not only explains the nature of dark energy but also provides an answer to the origin of dark matter. In addition, it can be used to describe the formation of structures. We study the scalar perturbations in this model and show that in the framework of the spherical collapse model, the formation of structures can be explained. We show that the formation of structures in this model occurs earlier than predicted in the standard cosmological model. We obtain the parameters of spherical collapse, such as spherical overdensity in the framework of the non-canonical scalar model. We present the results of the analysis of the tensor perturbations, which are assumed to be traceless and transverse. We find the effect of these perturbations on the action up to the second-order and obtain the mass of gravitational waves. We demonstrate that by choosing the proper values for the potentials and the parameters of the model, the calculated value for the mass of gravitational waves is highly consistent with the observations of Laser Interferometer Space Antenna (LISA), Square Kilometre Array (SKA), and Parkes Pulsar Timing Array (PPRA).

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