Title:	Quantum-to-classical transition and imprints of continuous spontaneous localization in classical bouncing universes
Authors:	Stargen, D. Jaffino (/jspui/browse?type=author&value=Stargen%2C+D.+Jaffino)
Keywords:	bouncing cosmology primordial perturbations continuous spontaneous localization
Issue Date:	2021
Publisher:	World Scientific
Citation:	International Journal of Modern Physics D, 30(7).
Abstract:	The perturbations in the early universe are generated as a result of the interplay between quantum field theory and gravitation. Since these primordial perturbations lead to the anisotropies in the cosmic microwave background and eventually to the inhomogeneities in the Large Scale Structure (LSS), they provide a unique opportunity to probe issues which are fundamental to our understanding of quantum physics and gravitation. One such fundamental issue that remains to be satisfactorily addressed is the transition of the primordial perturbations from their quantum origins to the LSS which can be characterized completely in terms of classical quantities. Classical bouncing universes provide an alternative to the more conventional inflationary paradigm as they can help overcome the horizon problem in a fashion very similar to inflation. While the problem of the quantum-to-classical transition of the primordial perturbations has been investigated extensively in the context of inflation, we find that there has been a rather limited effort toward studying the issue in classical bouncing universes. In this work, we analyze certain aspects of this problem with the example of tensor perturbations produced in classical matter and near-matter bouncing universes. We investigate the issue mainly from two perspectives. First, we approach the problem by examining the extent of squeezing of a quantum state associated with the tensor perturbations with the help of the Wigner function. Second, we analyze the issue from the perspective of the quantum measurement problem. In particular, we study the effects of wave function collapse, using a phenomenological model known as continuous spontaneous localization, on the tensor power spectra. We conclude with a discussion of results.
Description:	Only IISER Mohali authors are available in the record
URI:	http://dx.doi.org/10.1142/S0218271821500498 (http://dx.doi.org/10.1142/S0218271821500498) http://hdl.handle.net/123456789/4538 (http://hdl.handle.net/123456789/4538)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

File	Description	Size	Format	
Need To Add…Full Text_PDF. (/jspui/bitstream/123456789/4538/1/Need%20To%20Add%e2%80%a6Full%20Text_PDF.)		15.36 kB	Unknown	View/Open (/jspui/l

Show full item record (/jspui/handle/123456789/4538?mode=full)

(/jspui/handle/123456789/4538/statistics)