Title:	Non-linear spherical collapse in tachyon models and a comparison of collapse in tachyon and quintessence models of dark energy
Authors:	Rajvanshi, M.P. (/jspui/browse?type=author&value=Rajvanshi%2C+M.P.) Bagla, J.S. (/jspui/browse?type=author&value=Bagla%2C+J.S.)
Keywords:	cosmological perturbations dark energy quintessence spherical collapse tachyonic models
Issue Date:	2020
Publisher:	IOP Publishing Ltd.
Citation:	Classical and Quantum Gravity, 37(23)
Abstract:	We study evolution of perturbations in dark matter and dark energy for spherical collapse using a completely self consistent, relativistic approach. We study tachyon models of dark energy using the approach outlined in Rajvanshi and Bagla (2018). We work with models that are allowed by current observations. We find that as with quintessence models allowed by observations, dark energy perturbations do not affect evolution of perturbations in dark matter in a significant manner. Perturbations in dark energy remain small for such models. We then take two different Lagrangians for dark energy: tachyon and quintessence models, reconstruct potentials to have same expansion history and then compare if two can be distinguished in the nonlinear regime. Any variations we find are only due to a different Lagrangian density, and allow a comparison of different classes of models in a fair manner. We find that dark matter perturbations carry no imprint of the class of dark energy models for the same expansion history: this is significant in that we can work with any convenient model to study clustering of dark matter. We find that the evolution of dark energy perturbations carries an imprint of the class of models and dark energy perturbations grow differently in tachyon models and quintessence models for the same expansion history. However, the difference between these diminishes for $(1 + w) \ll 1$ and hence prospects for differentiating between models using characteristics of perturbations are limited in our Universe.
URI:	https://iopscience.iop.org/article/10.1088/1361-6382/abbb63 (https://iopscience.iop.org/article/10.1088/1361-6382/abbb63) http://hdl.handle.net/123456789/3157 (http://hdl.handle.net/123456789/3157)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need to add pdf.odt (/jspui/bitstream/123456789/3157/1/Need%20to%20add%20pdf.odt)		8.63 kB	OpenDocument Text	View/Open (/jspui/bitstream/12345

Show full item record (/jspui/handle/123456789/3157?mode=full)

(/jspui/handle/123456789/3157/statistics)