

Effect of an external interaction mechanism in solving agegraphic dark energy problems

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Abstract Agegraphic dark energy (ADE) and New-ADE models have been introduced as two candidates for dark energy to explain the accelerated expansion phase of the Universe. In spite of a few suitable features of these models some studies have shown that there are several drawbacks in them. Therefore in this investigation a new version of ADE and New-ADE are studied which can improve such drawbacks appearing in the ordinary ADE and New-ADE scenario. In fact we consider an interacting model of scalar field with matter and after re-deriving some cosmological parameters of the model, we find out the best fit for the model. Actually by finding the best fitting for free parameters of the

model, we show that our theoretical results are in a good agreement with observational data.

Keywords Agegraphic dark energy · Chameleonic scalar interaction · Phantom crossing · Coincidence problem · Classical non-stability · Data fitting

1 Introduction

During two past decades, numerous observational data, such as Supernovae type-Ia (SnIa) (Riess et al. 1998, 2004; Perlmutter et al. 1999; Astier et al. 2006), Cosmic Microwave Background (Peiris et al. 2003; Bennett et al. 2003; Spergel et al. 2003) and so on, faced scientists with this shocking fact that the Universe is undergoing an accelerated expansion phase. Some people look for the source of this acceleration in the geometrical part of the Hilbert-Einstein action and have studied the modified gravity (Wands 1994; Nojiri and Odintsov 2007; Saaidi et al. 2012c; Saaidi and Aghamohammadi 2011). On the other hand some researchers believe that the Universe should be dominated by an ambiguous kind of fluid with negative pressure, called dark energy, which is able to provide such an expansion. The cosmological observational data express that the Universe includes 73 % dark energy, 23 % dark matter and only 4 % baryons, note that the contribution of radiation could be ignored against to the other components of the Universe. The nature and origin of dark energy is unknown for scientists and this fact makes this kind of fluid to one of the most puzzling aspects of the Universe. Up to now, many proposals have been introduced to realize this phenomenon. It seems that the best candi-

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