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Ebrahimi: ”Clustering of Cold Dynamical Dark Energy Models”

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The nature of dark energy can be investigated not only by equation of state but also through clustering and sound speed. In this research, we examine clustering of some dynamical dark energy models namely, power-law (PL), Chavelier-Polarski-Linder (CPL) and Feng-Shen-Li (FSL). We will go beyond zero-order and Free parameter of models constraints by using current available data including Planck DR2, Baryonic Acoustic Oscillation (BAO) and Supernovae type Ia (SNIa) observation and Hubble space telescope (HST). We investigate that PL as early dark energy has different behavior rather than semi-LCDM models such as rapid potential changes, higher matter density contrast due to crossing LCDM equation of state and matter behavior at early universe. We quantify the importance of uncoupled dark energy clustering, PL exhibits strong clustering with $\delta P_L > 0$ which can grow faster than δm and semi-LCDM models produce void of dark energy with powerless amplitude around 10−12. In the linear regime, density contrast, growth rate index $f(\sigma 8)$ and gravitational potential computed. Furthermore, temperature anisotropy and matter power spectrum by modification of CAMB for dynamical models obtained and ISW effect. PL shows more ISW effect, more value for matter power spectrum at large scale around k=0.01.Tension between HST and CMB for H0 disappears for all models.