Impact of dark energy on the equation of state in light of the latest cosmological data		
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Abstract: In this study, we reconstruct the effective equation of state (EoS) for a homogeneous and isotropic Friedmann–Lemaître–Robertson–Walker universe, considering matter and dark energy (DE) within general relativity. Using a dataset that includes 31 cosmic chronometer points, 6 baryon acoustic oscillation points, and 1048 type Ia supernovae from the Pantheon sample, we determine the best-fitting model parameters through Markov chain Monte Carlo simulation. We then calculate various cosmological parameters, such as the DE EoS parameter, energy density, deceleration parameter, state-finder parameters, and the Om(z) diagnostic. The results are consistent with an accelerated expansion of the universe.