

Re-accelerating expansion of the Universe revealed by type Ia supernovae and Planck data

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The possibility that we are living in an expanding underdense region has made many to debate if dark energy is needed to explain the apparent over-dimming of distant Type Ia supernovae (SNe Ia). In this report, we first show that the currently best measured local Hubble constant is larger than the cosmological Hubble constant, i.e., our local universe is expanding faster than the distant universe. We then show that this local Hubble bubble is significantly underdense due to the low peculiar velocities of Type Ia supernovae hosts within it, compared to galaxies outside it. Finally we demonstrate that the existence of this bubble is consistent with the concordance cosmological model dominated by dark energy.

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