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**Observation of Temporal Oscillations in the Scale Factor Explained by Scalar-Field Dark Matter** HARRY RINGERMACHER, LAWRENCE MEAD, Dept. of Physics Astronomy, University of Southern Mississippi — We observe damped temporal oscillations in the scale factor of the universe at a dominant frequency of  $\sim 7$  cycles/Hubble-time in the recent Pantheon Compilation of 1048 type Ia supernovae (SNe). The residual oscillations observed in the Pantheon data closely matches and reaffirms our initial observation of oscillations from earlier SNe data (SNLS3, 2011). The observed signal amplitude is at 3 sigma. Our model describing the oscillations is a simple scalar field harmonic oscillator coupled to the LCDM Friedmann equation, but carried into the present epoch. The scalar field energy density takes over the role of the dark matter energy density in LCDM cosmology, fits LCDM well, and matches the present dark matter density parameter. Our model fits the observed signal in frequency, phase and damping, but is a factor of 2 too small in amplitude. The amplitude could be increased by including parametric resonance.

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