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A MEASUREMENT OF SECULAR EVOLUTION IN THE PRE-WHITE-DWARF STAR PG 1159-035

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ABSTRACT. We have analyzed 96 hours of high-speed photometry the pulsating variable star PG 1159-035, obtained from 1979 through 1984. We find that the pulsation period with the largest amplitude, at 516 s, is changing at a rate $dP/dt = (-1.2 \pm 0.1) \times 10^{-11}$ s/s, corresponding to an evolutionary timescale of $\tau \sim (1.4 \pm 0.1) \times 10^6$ yrs. This period change is consistent with theoretical descriptions of a gravitationally contracting pre-white-dwarf object undergoing nonradial g-mode pulsations.

The analysis of the light curve is materially complicated by the presence of at least seven additional periodicities, ranging from 350 s to 842 s, and by the inevitable presence of 24 hour aliases for all of them. We describe in detail the methods used to measure dP/dt and to eliminate all possible alternative values for it.

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