The DBV White Dwarf EC 20058–5234: the continuing story

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The helium atmosphere pulsator, EC 20058–5234 currently defines the hot edge of the DBV instability strip. Its effective temperature, estimated by both spectroscopic and asteroseismic techniques, is consistent with an extremely hot core in which models predict a neutrino cooling flux, created primarily by the plasmon decay process, exceeds the surface photon flux. Although EC 20058 is multiperiodic, it has been shown to be a very stable pulsator with two dominant modes. Contraction of the white dwarf has largely ceased in the DBV instability strip temperature regime, so the decreasing temperature due to cooling should lead to very small increases in the pulsation periods provided no other effects such as resonant mode trapping occur. Beginning with a Whole Earth Telescope run in 1997, we have regularly obtained seasonal data on EC 20058 (largely at Mt John observatory in NZ) in an effort to determine a Pdot for its pulsation modes and connect this to the the theoretical neutrino cooling mechanism. This paper will report on our success to date.