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Tidal Interaction among Red Giants Close Binary Systems in APOGEE Database MENG SUN, PHIL ARRAS, NICK TROUP, STEVE MAJEWSKI, University of Virginia, Astronmy Department, NEVIN WEINBERG, Department of Physics and MIT Kavli Institute, MIT — Motivated by the newly discovered close binary systems in the Apache Point Observatory Galactic Evolution Experiment (APOGEE-1), the tidal evolution of binaries containing a red giant branch (RGB) star with a stellar or substellar companion was investigated. The tide raised by the companion in the RGB star leads to exchange of angular momentum between the orbit and the stellar spin, causing the orbit to contract. The tidal dissipation rate is computed using turbulent viscosity acting on the equilibrium tidal flow, where careful attention is paid to the effects of reduced viscosity for close-in companions. Evolutionary models for the RGB stars, from the zero-age main sequence to the present, were acquired from the MESA code. "Standard" turbulent viscosity gives rise to such a large orbital decay that many observed systems have decay times much shorter than the RGB evolution time. Several theories for "reduced" turbulent viscosity are investigated, and reduce the number of systems with uncomfortably short decay times.

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