ACCRETING DOUBLE SHELL SOURCE DEGENERATE STARS

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Ultraviolet photometry from the OAO-2 satellite supports the white dwarf thermonuclear runaway model for the symbiotic star AG Peg (Gallagher et al. 1979). Massive white dwarfs ($M>1.1M_\odot$) burning hydrogen in a steady state with accretion (Sion et al. 1979) undergo either repetitive hydrogen shell flashes ($\dot{M}\leq 1.03\times 10^{-7} M_\odot/yr$), burn hydrogen stably in a steady state with accretion ($1.03\leq\dot{M}\leq 2.7\times 10^{-7} M_\odot/yr$) or evolve into a red giant structure ($\dot{M}\geq 2.7\times 10^{-7} M_\odot/yr$). The nuclear reactions do not "shut off" between outbursts and mass is not ejected. If these models represent the behavior of the hot component of symbotic variable stars, the high luminosities and masses lead to the possibility that helium shell burning should be important as an additional energy source. The behavior of double shell burning near the surface of a white dwarf of any luminosity has not been explored (Webbink et al. 1978). Models have been constructed to represent such stars having (1) $M=1M_\odot$, $\dot{M}=1.25\times 10^{-7} M_\odot/yr$ ($L=10^4 L_\odot$), log $T_e=5.70$ and log $R=8.965$ and (2) $M=1M_\odot$, $\dot{M}=1.26\times 10^{-8} M_\odot/yr$ ($L=10^3 L_\odot$), log $T_e=5.52$ and log $R=8.85$. Evolutionary sequences using these initial double shell source models are being constructed.

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