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Some Be stars which are intermittent X-ray sources may have white dwarf companions rather than neutron stars. It is not possible to prove or rule out the existence of Be+WD systems using X-ray or optical data. However, the presence of a white dwarf could be established by the detection of its EUV continuum shortward of the Be star's continuum turnover at 1000Å. Either the detection or the nondetection of Be+WD systems would have implications for models of Be star variability, models of Be binary system formation and evolution, and models of wind-fed accretion.

Several dozen X-ray sources are known or suspected to be associated with Be stars (van den Heuvel 1987). It is generally believed, on the basis of X-ray luminosities and pulse periods, that in most or all of these cases the X-ray emission comes from accretion onto neutron stars (e.g. Apparao 1985; van den Heuvel and Rappaport 1987). However, Waters *et al.* (1989) estimate that there should be about *ten times* more Be+WD systems than Be+NS systems within 1 kpc of the Earth. Yet no case in which the accreting companion is a white dwarf has so far been found (Apparao 1991).

Waters et al. (1989) admit that the low X-ray luminosities of these systems might be produced if the companions were neutron stars in very wide orbits such that the wind from the Be star is of low density at the distance of the neutron star. However, they argue that theoretical calculations of the formation and evolution of a Be+NS system predict that the neutron star would *not* end up in such a wide orbit. Thus X-ray observations alone cannot presently determine whether the accreting companion is a neutron star, He star, or white dwarf.

Ghosh, Apparao and Tarafdar (1989) and Apparao (1991) argue that some Be stars which show large optical outbursts may do so because of accretion onto white dwarf or He star companions. These authors suggest that optical emission enhancement occurs when the expanding gas envelope from the Be star reaches the compact object, some days or months after the intrinsic outburst in the Be star, leading to the formation of an HII region which then optically re-radiates X-ray and EUV emission from the accretion event within. No X-ray spectrum, which could ordinarily be used to infer the existence and nature of the accreting companion, is evident because of absorption due to the gas envelope. Although optical continuum and line flux enhancements are typical of Be stars, Apparao (1991) calculates that the magnitude of the outburst if it were due to accretion onto a white dwarf or He star would be much larger for late type Be stars than for early types, ranging from 0.07 V magnitudes for a B0 star to 1.22 for a B8 star. For this reason he suggests that late type Be stars showing large optical enhancements are possible candidates for having white dwarf of He star companions, and suggests HR 4804 as a good candidate.

It was the goal of this program to search for the presence or absence of a hot white dwarf companion to HR 4804 by examining its EUV spectra shortward of Lyman alpha using the EUVE. (The other known candidates were too heavily absorbed to be detected by EUVE.) Since the relatively bright UV spectrum of B stars falls off precipitously shortward of about 1000Å, depending somewhat on the type, observations at IUE wavelengths could not detect a white dwarf companion in any of the candidate systems. However, for a B8 star such as HR 4804, a continuum flux in the EUVE MW detector would be clear indication of a white dwarf. The flux from HR 4804 itself should not contribute significantly. The Voyager UVS data, as well as theoretical models, suggested no detectable EUV flux from the primary at those wavelengths. Also, Beta Per, which is a B8V at 32 pc, was not detected in the deep survey or the Bright Source List except in the SW detector at 0.2 cts/s. Since HR 4804 is 6 times further and is a Be star with heavy intrinsic absorption of the B star UV due to the circumstellar material, it should contribute no significant continuum at EUV wavelengths.

The purpose of this program was to search for a possible white dwarf companion during a quiescent phase when the WD, if it exists, is far enough from the Be primary that no accretion event is underway. The goal was to look for the simple presence or absence of continuum emission in the 100Å to 300Å region. This energy band was chosen as the one in which a white dwarf companion is most likely detectable by EUVE, although all energy bands were examined.

It was exepected, on the basis of the ISM transmission tables available, that for HR 4804 even a nondetection by EUVE would be able to rule out a white dwarf companion for this object. A 60 ksec exposure was obtained. No flux was detected. An analysis using the IRAF data reduction package obtained an upper limit on detected flux of 0.0006 phot cm^{-2} s^{-1} $Å^{-1}$ in the MW detector covering 180Å to 360Å. In the SW detector, covering 100-120Å, an upper limit was obtained of 0.004 phot cm^{-2} s^{-2} $Å-1$. In the LW detector, in the region of 350-500 Å where some flux might have been expected, an upper limit of 0.0005 was obtained. An analysis of the Deep Survey Photometer field also revealed no flux, which pushed the upper flux limits down by about a factor of 10 (the exact amount is uncertain due to calibration problems of the DSP).

These fluxes were convolved with white dwarf emission models and the most recent values for ISM absorption at EUV wavelengths. Unfortunately, the results are ambiguous. The most recent ISM absorption models, based on accumulated EUVE experience, are more pessimistic about the degree of absorption than was thought at the time the proposal was written. There is enough uncertainty in the H and He column density toward HR 4804 that the new ISM absorption model suggests that a white dwarf companion to this star may not be detectable by EUVE. Thus it is not possible to say whether the null detection of this program represents the absence of a WD companion, or merely the strong absorption by the ISM.

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