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## THE IDENTITY OF DO Vul

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DO Vul (AN 25.1928) is a variable star discovered by Baade (1928) during his Bergedorfer days. The GCVS lists it as a UG cataclysmic variable with an outburst magnitude of  $m_{\rm pg} = 14.0$  and a quiescent magnitude fainter than  $m_{\rm pg} = 17.4$ . Skiff (1997), in acquiring proper identification for Baade's variables, found that most of Baade's positions in the Sagitta field were quite accurate, with typical errors less than 2 arcsec. However, Skiff could not locate DO Vul at the Baade position on the DSS. Downes and Shara (1993, DS93) identified DO Vul only as the northwestern star of a close faint pair (with a further comment that it could be a faint companion); no additional identification was given in Downes, Webbink and Shara (1997, DWS97) though the coordinates were changed slightly. The identification of DO Vul has been uncertain since this is a crowded field and there has been no modern epoch visual outburst (Mattei 2001). Tsesevich (1978) reported nine faint outbursts ( $m_{\rm pg} = 16.0$  to  $m_{\rm pg} = 17.1$ ) in the interval October 1960 through July 1976 on Moscow plates; these bursts were only above the plate limit for a day or less.

During the course of various monitoring studies, we have been able to observe the field for DO Vul and unambiguously determine which star is the variable. Shown in Figure 1 is an image of the field, taken with the MDM Observatory 2.4-m telescope, while DO Vul was at quiescence. Figure 2 shows the same field, taken with the USNO Flagstaff STation 1.0-m telescope, while DO Vul was in outburst (May 19, 1999 UT).

There have been several reported positions for the variable. We list the three normal ones in Table 1, along with our measured (using USNO-A2.0) outburst and quiescent positions. The star originally identified as DO Vul in DS93 lies 2.4 arcsec east of the star identified here; its coordinates are given in Table 1 as well.

The photometry for DO Vul and for the nearby companion is given in Table 2. The field zero point was set from the secondary standards given in Henden (2001).

We would like to thank Bill Fenton for taking the data at MDM.



Figure 1. Quiescent V-band image of field on 010522 UT; the scale mark is one arcmin



Figure 2. Outburst V-band image of field on 990519 UT

Source	RA(J2000)	$\mathrm{Dec}(\mathrm{J2000})$
Baade	$19^{\rm h}52^{\rm m}10 estricket{.}{ m 52}$	$+19^{\circ}34'44''$
DS93	$19^{\rm h}52^{\rm m}11 .0$	$+19^{\circ}34'39''$
DWS97	$19^{\rm h}52^{\rm m}11 m .0$	$+19^{\circ}34'42''$
$\operatorname{Quiescent}$	$19^{\rm h}52^{\rm m}10^{\rm s}.71$	$+19^{\circ}34'42''_{\cdot}5$
Outburst	$19^{\rm h}52^{\rm m}10^{\rm s}.74$	$+19^{\circ}34'42''_{\cdot}4$
Companion	$19^{\rm h}52^{\rm m}10^{\rm s}\!.88$	$+19^{\circ}34'42''_{\cdot}4$

Table 1: Coordinates for DO Vul

Table 2: Photometry of DO Vul					
State	V	B - V	U - B	V - I	
Quiescent	$20.73 \pm 0.05$	$+0.08 \pm 0.10$	$-0.99\pm0.17$	$+0.64 \pm 0.10$	
Outburst	$16.427 \pm 0.016$	$+0.167 \pm 0.019$			
Companion	$19.670 \pm 0.020$	$+1.65\pm0.06$	$+0.24\pm0.36$	$+2.504 \pm 0.021$	

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