

X-RAY OBSERVATIONS OF SYMBIOTIC STARS

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ABSTRACT

Observations are reported of 19 symbiotic stars made with the imaging proportional counter of the Einstein Observatory. Three of the objects (HM Sge, V 1016 Cyg and RR Tel) were detected as soft X-ray sources. All three have shown slow-nova eruptions in the past 40 years. The data are interpreted as support of a model for slow novae involving thermonuclear events on white dwarfs which accrete from M giant companions. Symbiotic stars in their steady state, not being detected X-ray sources, are presumed to be powered by the accretion process alone.

The observations are summarized in table 1.

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Table 1. X-ray and other data on symbiotic stars

NAME	F_x	N_e	IP	CS Dust	$F_{2\text{cm}}$	Sp.	Opt.Var
AX Per	<9	low	var	N	-	M	R
AS 201	<6	high	25	Y	<17	G	N
He2-38	<6	low	80	Y	<6	M	N
He2-106	<11	low	100	Y	40	M	N
BD-21 3873	<7	extreme	70	N	-	G	N
He2-127	<11	low	100	Y	<12	M	N
Hen 1092	<4	medium	80	N	<18	K	N
HD 330036	<7	low	40	Y	-	G	N
He2-171	<12	low	120	Y	<12	M	N
Hen 1242	<4	high	70	N	<22	M	N
V 455 Sco	<8	medium	100	N	<12	M	R
AE Ara	<5	high	50	N	<18	M	R
H1-36	*	low	90	Y	91	-	N
Y CrA	<6	high	90	N	<20	M	R
AS 295B	<12	high	250	-	-	M	R
HM Sge	83±6	medium	rising	Y	57	M	S
CI Cyg	<5	medium	100	N	-	M	R
V 1016 Cyg	75±5	low	100	Y	110	M	S
RR Tel	18±3	medium	120	Y	54	M	S

F_x = X-ray Flux 0.2 - 2 keV $\times 10^{-14}$ ergs cm^{-2} s^{-1}

N_e = Electron density class

IP = Ionization Potential in eV

CS Dust = Is Circumstellar Dust present?

$F_{2\text{cm}}$ = Radio Flux at 2 cm in mJy

Sp. = Spectral type of the cool star

Opt.Var. : N = No history of Variability

R = Rapid variations in the form of minor nova-like outbursts typically every few years and of 3-4 magnitudes amplitude.

S = Slow-nova outbursts with time scales of many decades and amplitudes near 8 mag.

* H1-36 is discussed elsewhere