

# Radial Velocity and Photometric Study of the Long Period Interacting Binary AQ Cas

Yong-Sam Lee, Yong-Woo Chun, Jang Hae Jeong  
Department of Astronomy and Space Science  
Chungbuk National University

Il-Seong Nha  
Department of Astronomy and Atmospheric Science  
Yonsei University

## Abstract

AQ Cassiopeiae (BD +61° 0242,  $m_v=10$ , Sp=B3+B9) is a totally eclipsing binary system with the orbital period of about 12 days. It was observed for 15 nights in 1985 with the 1.8-m telescope at the DAO, employing a Reticon and a three-stage image tube attached to the spectrograph. And also, photometric observations of AQ Cas had been made in *UBV* for six years from 1982 to 1988 at Yonsei University Observatory(YUO). This work includes *UBV* observations obtained at YUO as a part of The Ten-Year Observing Program(1982-1992). Double lined radial velocity curves and *UBV* light curves of AQ Cas are constructed. The light curves and radial velocity curves show a strong evidence of circumstellar matter or mass stream. It is clear at the phases of just outside external eclipse contacts, particularly at phase 0.8-0.9, shown in Figures 1 and 2. A solution by combining the radial velocity and photometric curves of the binary was obtained with the Wilson-Devinney Code. We found that the system is semi-detached with the cool component filling its Roche lobe. The absolute dimensions of AQ Cas are calculated. The result shows that this system consists of two massive and subgiant stars.

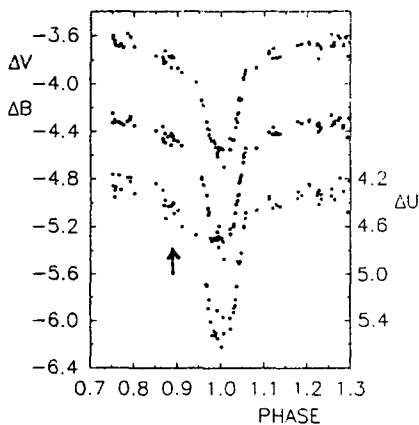


Figure 1. Light curves of AQ Cas in 1982-88.

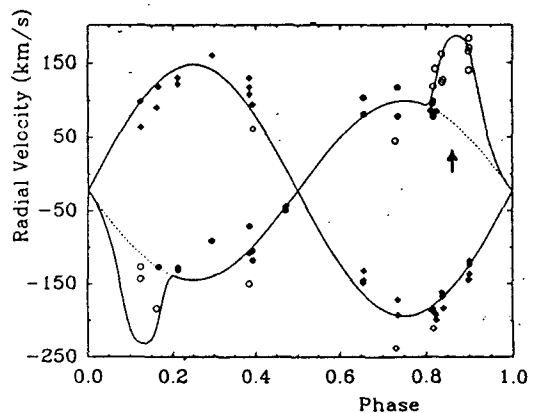


Figure 2. Radial velocity curves of AQ Cas in 1985.