Detection of Van Hoof effect in RR Lyrae stars from BOES Observations

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The Van Hoof effect, a phase lag between hydrogen and metallic line, has been interpreted as the propagation time of the pulsation wave through the atmosphere of pulsating stars. The Van Hoof effect between hydrogen and metallic lines was observed for the first time by Mathias (1995), but he couldn't detect similar effect between metallic lines. On the other hand, Chadid (1998) argues that the Van Hoof effect exists not only between hydrogen and metal line but also between some metallic lines. In order to investigate the existence of the Van Hoof effect in RR Lyrae stars, we observed three RR Lyrae stars using BOES at the Mt Bohyun 1.8-m telescope. Velocity curves of HI, OI and 8 metal elements were derived from high resolution spectra. The accuracy of velocity determination was measured against telluric lines and turned out to be better than 1 km/s in all wavelength domain. From the velocity-velocity diagram, we detect very clear sign of Van Hoof effect between hydrogen and metallic lines. We also find velocity-velocity correlation that can be considered as the Van Hoof effect between selected metallic lines.