The Optical Aspect of Variability of X-ray Transient MAXI 1659-152

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Abstract
We took optical observations of a newly detected X-ray transient, MAXI 1659-152. Although the optical counterpart was detected, the clear period associated with the period of the X-ray variation was not obtained first. After omitting the noisy data, 0.14190 d was obtained.

Key words: workshop: proceedings — LaTeX2.09: style file — instructions

1. What is MAXI 1659-159?
MAXI 1659-159 is a X-ray transient discovered on 25th of September, 2010 by the MAXI/GSC auto-detection alert (Negoro et al. 2010).

With the X-ray observations, the periodic variations of 2.4 - 2.5 hours in this object was reported. According to the X-ray QPO variation, this system is thought to be a black hole binary (M. Kalamkar et al. 2010). The periodic variation is thought to be related to the orbital period. If this period of 2.4 - 2.5 hours is the orbital period, this object has the shortest orbital period ever discovered (Kuulkers et al. 2010; The shortest orbital period of LMXB ever known is 0.16995 d in KV UMa, Richter & Kolb, 2011).

With this brightening in X-ray, the optical counterpart also brightened. On 26th September, the field of this object was imaged with 2 m Faulkes Telescope North and a bright (V = 16.8) optical transient was detected (Russell et al. 2010). The optical counterpart brightened furthermore and reached the maximum magnitude around 28th September. The magnitude of this object in quiecent is 22.4 R and the magnitude of this brightening is around 6 magn. To investigate the short optical variation of this object, we performed optical photometric observations.

2. Observations & Result
We performed optical observations this object with CCD. Kyoto team used 40cm Schmidt-Cassegrain telescope, while H. Maehara used 25cm reflector telescope. S. Kiyota used 60cm, 25cm, and 30cm reflector telescope at Mayhill. The obtained light curve exhibits that this object was at 16 ~ 17 mag. Since MAXI 1659-152 is available to be observed in only 1 – 2 hours after the sun set, we cannot enough observations. The luminosity of MAXI 1659 was declining slowly. The speed of the decline is 0.026(6) magn. / day.

3. Supplement
After the conference, one of the authors (TK) investigated the period of this object again. After omitting the noisy data, the period of 0.104190 d is obtained.

References
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Fig. 1. ISS (Sample of 2 column figure).