EPSC Abstracts
Vol. 13, EPSC-DPS2019-205-1, 2019
EPSC-DPS Joint Meeting 2019

EPSC
EPSC-DPS Joint Meeting 2019
15–20 September 2019 | Geneva, Switzerland

Study of the Comet C/2018 Y1

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Abstract

Comet Iwamoto was discovered by Masayuki Iwamoto on december 20, 2018. This comet has an orbital period of 1,371.3 years [1], and its next passage around the sun will occur in the year 3390. The comet was closer to the earth on February 12 and its distance to our planet was 45 million kilometers. The perihelion occurred on February 7 [2]. The comet reaches aphelion far beyond the Kuiper Belt in the world of Severe Trans-Neptunian Things [3]. This comet is traveling at a speed of 238,099 km/h, relative to Earth [4]. Astrometry was carried out, and I obtained the orbital parameters of this comet, and I also obtained the light curve of the body with our data.

1. Introduction

From our Observatory, located in Pasto-Colombia, I captured several pictures, videos and astrometry data during several days. The animations were published by SPACEWEATHER on the following dates: February 14 [5] and February 23 [6]. The pictures of the asteroid were captured with the following equipment: CGE PRO 1400 CELESTRON (f/11 Schmidt-Cassegrain Telescope) and STL-1001 SBIG camera.

2. Pictures

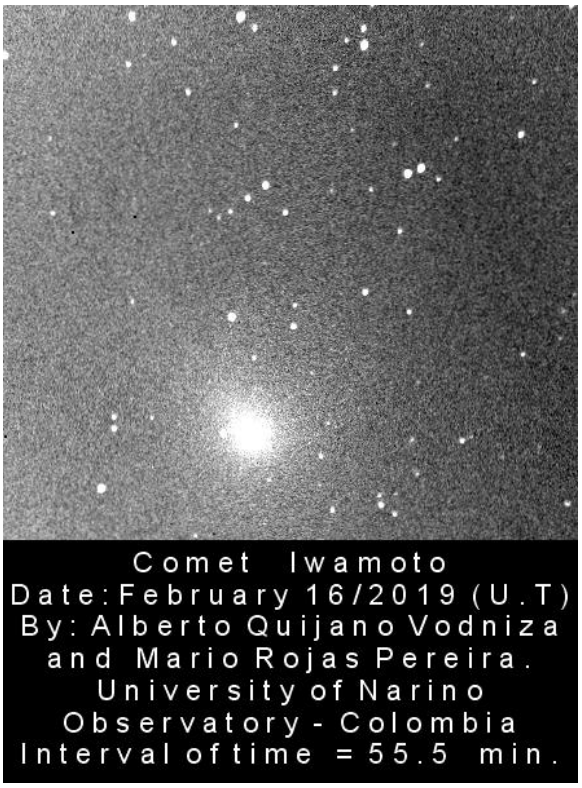

Figure 1: Comet Iwamoto – February 16/2019 (U.T)

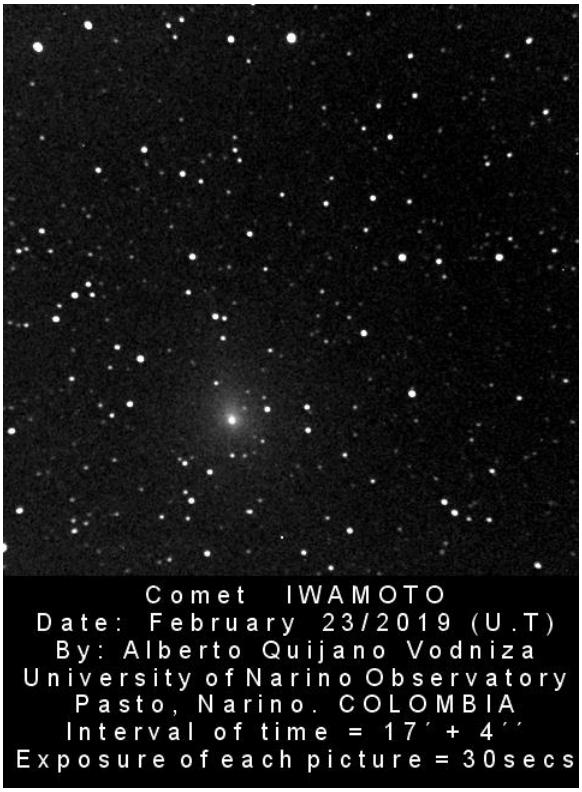

Figure 2: Comet Iwamoto – February 23/2019 (U.T)

3. Equations

The brightness' variation of a comet with respect to the heliocentric distance is given by the following equation:

$$m = mo + 2.5\, n \log (r) + 5 \log (\Delta) \qquad (1)$$

m = magnitude as observed from the Earth
mo = absolute magnitude
r = distance of the comet in relation to the Sun
Δ = distance of the comet in relation to the Earth
n = index of cometary activity.

The absolute magnitude informs us about the intrinsic brightness of the comet. The term related with the geocentric distance involves a variation of the brightness with the square distance's inverse. At the same time the term related with the heliocentric distance holds the factor (n) which varies from comet to comet and is important because its value is related with the physical processes that take place in the coma. The brightness changes more rapidly with the variations of the heliocentric distance, and the "n" value indicates how fast this change is. The law of a comet's brightness variation can be explained by means of the following equation:

$$I = Io\, \Phi (\alpha) / r^n \Delta^2 \qquad (\alpha) = \text{phase´s function} \quad (2)$$

4. Summary and Conclusions

We obtained the following orbital parameters: eccentricity =0.9920 +/- 0.0148, orbital inclination = 160.405 +/- 0.031 deg, longitude of the ascending node = 147.484 +/- 0.011 deg, argument of perihelion = 358.06 +/- 0.06 deg, perihelion distance = 1.287039 +/- 0.000636 A.U, mean motion = 0.00048 +/- 0.00134 deg/d, absolute magnitude = 12.2. The parameters were calculated based on 77 observations (Feb. 14-23) with mean residual = 0.19 arcseconds. I also obtained the light curve of the body with our data.

Acknowledgements

The author would like to thank to University of Narino-Pasto-Colombia.

References

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[5] http://spaceweathergallery.com/indiv_upload.php?upload_id=151903

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