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THE PROPER MOTION OF THE LARGE MAGELLANIC CLOUD REVISITED

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RESUMEN

El movimiento propio (PM) de la Nube Mayor de Magallanes (LMC) relativo a cuatro cuasares en el trasfondo de los respectivos campos, se ha determinado leyendo y reprocesando datos de las imágenes de dos estudios previos. El PM total del centro de masas de la LMC que se obtiene aquí es $\mu = (+1.94 \pm 0.08)$ mas yr^{-1}, con un ángulo de posición de $\theta = (61.5 \pm 3.2)^\circ$. Los nuevos resultados concuerdan razonablemente con aquellos obtenidos previamente por nuestro y otros grupos, y con varios modelos teóricos existentes. A partir de la velocidad radial del centro de la LMC obtenida de la literatura, en combinación con el vector velocidad transversal determinado de nuestra medición del PM en este trabajo, obtenemos la velocidad espacial del centro de la LMC. Usando esta última y suponiendo un potencial puntual de masa para la Galaxia, hemos estimado la cantidad de masa contenida dentro de 50 kpc desde el centro de la Galaxia.

ABSTRACT

The proper motion (PM) of the Large Magellanic Cloud (LMC) relative to four background quasi-stellar objects has been determined by reading and reprocessing image data from two previous studies. The total center of mass PM for the LMC obtained here is $\mu = (+1.94 \pm 0.08)$ mas yr^{-1}, with a position angle $\theta = (61.5 \pm 3.2)^\circ$. The new results agree reasonably well with those obtained previously by our group and by other groups, and with several existing theoretical models. From the radial velocity of the center of the LMC found in the literature, in combination with the transverse velocity vector determined from the PM measured in the present work, we obtain the space velocity of the LMC center. Using the latter and assuming a point-mass potential for the Galaxy, we have estimated the amount of mass contained within 50 kpc of the center of the Galaxy.

Key Words: astrometry — proper motions — Magellanic Clouds — quasars: general

1. INTRODUCTION

The present study is a follow-up of the works by Anguita, Loyola, & Pedreros (2000, hereafter ALP00), Pedreros, Anguita, & Maza (2002, hereafter PAM02), Pedreros, Costa, & Méndez (2006, hereafter PCM06) and Costa et al. (2009, hereafter CMP09), in which the PM of the LMC was determined using the "quasar method". This method, fully described in ALP00, PAM02 and PCM06, consists in using quasi-stellar objects (QSOs) in the background field of the LMC as fiducial reference points to determine the PM of the cloud. In this method, the position of the background QSOs is measured at different epochs with respect to a group of bona-fide field stars of the LMC (the Local Reference System, hereafter LRS). Because a QSO can be considered a fiducial

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