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2MASS view of the LMC: Structure, populations, kinematics

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Abstract

The results of a study of the Large Magellanic Cloud based on near-infrared 2MASS photometry are presented. From near-infrared color-magnitude diagram, stellar populations of the LMC are identified and characterized, and their spatial distributions are studied. The luminosity functions are presented for LMC bar and disk fields. Isochrone analysis is performed and estimates of age and metallicity of bar and disk populations are obtained. Geometrical structure of the LMC is studied and its distance modulus is estimated from AGB tip magnitude. Inferences about the spatial structure of the LMC are obtained by standard candle analysis based on carbon-rich long-period variables. The evidence is presented for material out of plane of the main LMC disk. Based on a maximum-likelihood analysis of 2MASS photometry and stellar kinematics available in the literature, the conclusion is derived that a secondary stellar component is present at roughly ~ 5 kpc behind the main LMC disk. This material has lower systemic velocity than the disk of the LMC and is shown to be able to enhance the microlensing optical depth and bring it to agreement with MACHO observations. ^

Subject Area

Astronomy

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