AN ESTIMATE OF THE DARK-MATTER CONTENT IN THE GALAXY

SLOBODAN NINKOVIĆ
Astronomska opservatorija, Volgina 7, 11050 Beograd, Yugoslavia

The total mass of the Milky-Way dark corona and its contribution to the total mass of the Galaxy, is estimated by combining the limits imposed by the Local Group as probably bound and the constraints on the local escape velocity. The results: total mass of the Milky Way about 1.6 $TM_{\odot}$ (dark corona over 1.5 $TM_{\odot}$; $T = 10^{12}$), local escape velocity about 600 kms^{-1}.

A lower limit on the local escape velocity from high velocity stars is 500 kms^{-1} (eg Cudworth, 1990). Recently, the distance of Leo I was redetermined (Lee et al., 1993). Using this value a model describing the mass distribution within the dark corona (Ninković, 1988) is extended towards higher values of its total mass. It is assumed that the contribution of the conventional matter (bulge+disc) to the local gravitational potential is 45 000 km^2s^{-2} according to the old value proposed for the local escape velocity. In this way using the condition that Leo I is bound one estimates the local escape velocity to be about 600 kms^{-1} and consequently the MW total mass about 1.6 $TM_{\odot}$ where the contribution of the dark corona exceeds 1.5 $TM_{\odot}$. If one assumes 1.5 as the approximate value for the mass ratio between Andromeda Nebula (AN) and MW (e. g. Ninkovich et al., 1991), then one finds 4 $TM_{\odot}$ for the total mass of the Local Group a value for which it may be bound; for example, provided that the local velocity of galactic rotation is 220 kms^{-1} and the radial part of the kinetic energy of relative motion AN-MW is one third of its total (isotropy).

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