A new Puzzle of the Cold Dark Matter Prediction in the Outer Density Profile of the Andromeda Galaxy

Takanobu Kirihara (Ph.D student; University of Tsukuba, Japan) (arXiv: 1408.4920)

Recent studies have predicted that CDM halos have a universal mass-density profile with the outer profile of $\rho(r) \propto r^{-3}$.

To examine this prediction, we simulate a galaxy collision in M31 with the DM halo profile of

$$\rho_{\text{DMhalo}}(r) = \rho_{s,\alpha} x^{-1}(1 + x)^{e,\alpha} + 1, \ x = r/r_{s,\alpha}.$$  

Outer density profile of the DM halo of M31 is steeper than that of the CDM prediction.