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There is No Missing Satellites Problem[1] STACY KIM, ANNIKA PETER, Ohio State Univ - Columbus, JONATHAN HARGIS, Space Telescope Science Institute — A critical challenge to the cold dark matter (CDM) paradigm is that there are fewer satellites observed around the Milky Way than found in simulations of dark matter substructure. We show that there is a match between the observed satellite counts corrected by the detection efficiency of the Sloan Digital Sky Survey (for luminosities $L \geq 340$ $L_\odot$) and the number of luminous satellites predicted by CDM, assuming an empirical relation between stellar mass and halo mass. The "missing satellites problem", cast in terms of number counts, is thus solved, and implies that luminous satellites inhabit subhalos as small as 10^7–10^8 $M_\odot$. The total number of Milky Way satellites depends sensitively on the spatial distribution of satellites. We also show that warm dark matter (WDM) models with a thermal relic mass smaller than 4 keV are robustly ruled out, and that limits of $m_{\rm WDM} \geq 8$ keV from the Milky Way are probable in the near future. Similarly stringent constraints can be placed on any dark matter model that leads to a suppression of the matter power spectrum on $\sim 10^7$ $M_\odot$ scales. Measurements of completely dark halos below 10^8 $M_\odot$, achievable with substructure lensing, are the next frontier for tests of CDM.

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