

Re-Assembling the Sagittarius Dwarf Galaxy

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What is the mass of the progenitor of the Sagittarius (Sgr) dwarf galaxy? Here, we reassemble the stellar debris using SDSS and 2MASS data to find the total luminosity and likely mass. We find that the luminosity is in the range $9.6\text{-}13.2 \times 10^7$ solar luminosities or $M_V \sim -15.1 - -15.5$, with 70% of the light residing in the debris streams. The progenitor is somewhat fainter than the present-day Small Magellanic Cloud, and comparable in brightness to the M31 dwarf spheroidals NGC 147 and NGC 185. Using cosmologically motivated models, we estimate that the mass of Sgr's dark matter halo prior to tidal disruption was $\sim 10^{10}$ solar masses.

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