The central spheroids of Milky Way mass-sized galaxies

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We study the properties of the central spheroids located within 10 kpc of the centre of mass of MilkyWay mass-sized galaxies simulated in a cosmological context. The simulated central regions are dominated by stars older than 10 Gyr, mostly formed in situ, with a contribution of ~30 per cent from accreted stars. These stars formed in well-defined starbursts, although accreted stars exhibit sharper and earlier ones. The fraction of accreted stars increases with galactocentric distance, so that at a radius of~8-10 kpc, a fraction of~40 per cent, on average, is detected. Accreted stars are slightly younger, lower metallicity, and more ?-enhanced than in situ stars. A significant fraction of old stars in the central regions come from a few (2-3) massive satellites (~1010M?). The bulge components receive larger contributions of accreted stars formed in dwarfs smaller than ~109.5M?. The difference between the distributions of ages and metallicities of old stars is thus linked to the accretion histories - those central regions with a larger fraction of accreted stars are those with contributions from more massive satellites. The kinematical properties of in situ and accreted stars are consistent with the latter being supported by their velocity dispersions, while the former exhibit clear signatures of rotational support. Our simulations demonstrate a range of characteristics, with some systems exhibiting a co-existing bar and spheroid in their central regions, resembling in some respect the central region of the Milky Way. © 2016 The Authors.

Dark matter

Galaxies: abundances

Galaxies: evolution