

R15a **The Once and Future Andromeda Stream**

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The interaction between an accreting satellite and the Andromeda galaxy has been studied using an N -body simulation to investigate the self-gravitating response of the disk, the bulge, and the dark matter halo to an accreting satellite. Our simulation shows that the “giant stream” is the tidal debris of the infalling satellite. The debris also produces diffuse shells on the east and the west side of M31 in agreement with observations, but for an accreting satellite mass of $M \leq 5 \times 10^9 M_\odot$, the disk survives the collision in its present form and negligible disk stars are ejected into the halo. Following the evolution of the merger past the present day, these shells expand further and a multiple large scale-shell system is finally formed in the outer region and a dense core forms in the inner region. The outermost large-scale shells in our simulation have a radius of > 50 kpc and these structures survive at least 4 Gyr from the present-day. We propose that recently discovered distant arc-like structures and metal rich stars at $R > 100$ kpc may be the remnants of ancient radial infall collisions similar to the one responsible for the currently observed giant stream.