

## X32a      Extremely Diffuse Satellite in the Remote Halo of NGC 253

Sakurako Okamoto (NAOJ), SNFC team

Over the last decade, wide-field resolved star studies have shown a remarkable variety of stellar substructures in the halos of the Milky Way and M31, attesting to the fact that accretions have played an essential role in shaping their evolution. Pushing these studies to galaxy systems beyond the Local Group is crucial to increasing sample size and deriving representative trends.

We present the discovery of NGC253-SNFC-dw1, a new satellite galaxy in the remote stellar halo of the Sculptor Group spiral, NGC 253. The system was revealed using deep, resolved star photometry obtained as part of the Subaru Near-Field Cosmology Survey that uses the Hyper Suprime-Cam on the Subaru Telescope. Although rather luminous ( $M_V \sim -12$ ) as a satellite galaxy, the system is one of the most diffuse satellites yet known, with a half-light radius of  $R_h = 3.4$  kpc and an average surface brightness of  $\sim 30.1$  mag arcmin $^{-2}$  within the  $R_h$ . The distribution of red giant branch stars is asymmetrical and displays two elongated tidal extensions pointing toward NGC 253, suggestive of a highly disrupted system being observed at the apocenter. The morphology of NGC253-SNFC-dw1 clearly shows that this is a natural path to produce such diffuse and extended galaxies. The surprising discovery of this system in a previously well-searched region of the sky emphasizes the importance of surface brightness limiting depth in satellite searches.