1. MODELS

- Stellar components are in dynamical equilibrium.
- Static gravitational potential is dominated by DM.
- DShps are considered as a collisionless system.
- Axisymmetry in both stellar and DM components.
- Velocity anisotropy, \( \beta_1 \), is constant.

2. DATA 2D distribution maps of member stars of twelve dSphs

- We investigate the non-spherical dark halo structures of the dwarf spheroidal (dSph) galaxies in the MW and M31.
- We construct axisymmetric mass models with velocity anisotropy in stellar system and we apply our models to kinematic data of the luminous dSphs.
- We find that most of these galaxies associate very flattened dark halos and a relation between star-formation history and dark halo structure of dSphs.
- The best-fit parameters, especially for the shapes of dark halos and velocity anisotropy, are sensitive to both the availability of kinematic data in the outer regions of the system as well as the effect of the small number of sample stars.
- Planned surveys of the MW and M31 dSphs using Hyper Suprime-Cam and Prime Focus Spectrograph will enable us to hunt large amount of faint member stars in the outer parts of dSphs and measure their kinematic data.

3. RESULTS

- Best-fit axial ratio of DM halo
- The relation between dark-halo structure and star-formation history
- Most of the dSphs have extremely elongated DM halos.

3. The Impact of sample selection on best-fit parameters

- We use the data only within half-light radii of dSphs.
- Then we run MCMC fitting analysis.
- Compare the results of above sampling to those of using all data.

The constraints on DM halo structures in dSphs are affected largely by distribution of member stars as well as the lack of kinematic sample.

Subaru HSC and PFS survey for dwarf satellites

- Subaru HSC and PFS provide unique opportunities to study internal chemo-dynamical structures of dSphs in detail.
- We can assemble many sample stars down to faint magnitude.
- We can measure their kinematic and metallicity data over large area out to the tidal radii.

These unique instruments allow us to obtain robust limits on dark halo distribution and characterize the chemical and dynamical evolution of dSphs.