

Z109b Revealing mass distributions of dwarf spheroidal galaxies in the Subaru-PFS era

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The dwarf spheroidal galaxies (dSphs) in the Local Group are excellent test beds for probing the properties of dark matter and its role in galaxy formation. These galaxies are sufficiently close that it is possible to measure line-of-sight velocities for large samples of resolved stars. This kinematic information enables us to study the structural properties of their dark matter halos. However, there are non-negligible uncertainties in the determination of the mass profiles of dark matter. In particular, this study has been hampered by the well-known degeneracy between dark matter mass density and the anisotropy of the stellar velocity dispersion tensor, which can lead to erroneous mass estimates.

The information encoded in the shape of the line-of-sight velocity distribution (LOSVD) is potentially a strong tool to break this degeneracy, but this requires sufficiently large kinematic samples over large areas out to the outer parts of dSphs and identification of foreground contamination. The combination of the 1.25 deg² field and 2394 fibers of the Subaru Prime Focus Spectrograph (PFS), plus pre-imaging with Hyper Suprime Cam, will allow us to make significant progress in this undertaking. Furthermore, the unique capability of PFS will permit us to revisit the core/cusp problem. In this talk, I will discuss the feasibility and future prospects for this dark matter study with Subaru-PFS survey using mock stellar samples.