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Exploring Milky Way Halo Substructures from Large-Area Digital Sky Surveys

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Over the last two decades, large-area digital sky surveys have provided deep photometric catalogs of stars in our Galaxy. The ability to detect and characterize substructures in our halo has increased dramatically. These substructures show that the Milky Way Galaxy is a complex and dynamic structure that is still being shaped by the accretion and merging of neighboring smaller galaxies. Sharma et al. (2010) developed a density-based hierarchical group-finding algorithm to identify stellar halo substructures in a catalog of M-giants from the Two Micron All Sky Survey (2MASS). This algorithm uncovered 16 substructures in the Milky Way halo, six of which were unknown at the time. In this talk, I will discuss the spectroscopic follow-up observations of one of the six substructure candidates. The radial velocities and the metailicities derived from the spectra show that the stars selected have kinematic and abundance signatures consistent with a disrupted merger remnant in the Galactic potential. I will also briefly discuss the application of this group-finding algorithm on a catalog of main-sequence turnoff (MSTO) stars from the Dark Energy Survey, which are more sensitive to low-luminosity events than the 2MASS M-giant sample. With higher photometric precision at the faint magnitude limit, more substructures could potentially be revealed with the future photometric surveys and provide a complete census of our Galaxy's recent accretion history.

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yes

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no

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