PHYSICS AND ASTRONOMY COLLOQUIUM

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"Stellar Streams from Globular Clusters in the Local Universe"

Abstract

Stellar streams form when a gravitationally bound ensemble of stars tidally tears apart, due to an underlying galactic potential. From the vast population of stellar streams in the Milky Way, we know that the morphology of thin, stellar streams, in particular, can be used to test the distribution and nature of dark matter. It is therefore crucial to extend searches for these streams to other galaxies than the Milky Way. In the course of the next decade, a wealth of extragalactic stellar streams observations will become available, and stellar streams will be observed in galaxies out to several hundred Mpc. How will we take full advantage of these observations and decipher the astrophysical information the data contain? In this talk, I review the current and future prospects of detecting stellar streams in external galaxies with a focus on globular cluster streams. I create mock-stellar streams and inject them to data from the PAndAS M31 survey to produce simulated M31 backgrounds mimicking what WFIRST will observe in M31. Additionally, I estimate the distance limit to which globular cluster streams will be observable. Recent results demonstrate that for a 1 hour exposure, using conservative estimates, WFIRST should detect globular cluster streams in resolved stars in galaxies out to distances beyond 3.5 Mpc. This volume contains at least 199 galaxies of which > 90% are dwarfs. If these external galaxies do not host spiral arms or galactic bars, gaps in their stellar streams provide an ideal test case for evidence of interactions with dark matter subhalos. Furthermore, obtaining a large sample of thin stellar streams can help constrain the orbital structure and hence the potentials of external halos.

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3:30 p.m.
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