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# Stellar streams embedded in a fermionic dark matter halo

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For the first time in the literature, a dark matter (DM) halo model based on first physical principles such as (quantum) statistical mechanics and thermodynamics is used to try to reproduce 6D phase-space observations in stellar streams. We model both DM haloes, the one of the progenitor and the one of its host with a spherical self-gravitating system of neutral fermions which accounts for the effects of particles escape and fermion degeneracy, the latter causing a high-density core at the center of the halo. Full baryonic components for each galaxy are also considered. We analyze cold streams (such as GD-1) as well as the Sagittarius (Sgr) stream. For the later we use a spray algorithm with ~10^5 particles to generate the Sgr tidal debris which evolves in the combined gravitational potential of the host-progenitor system, to then make a direct comparison with the full phase-space data of the stream. We repeat this kind of simulations for different parameter setups of the fermionic model with special attention to test different DM halo morphologies allowed by the physics. We find that both allowed profiles, i.e. polytropic or power law-like, can fit the essential features of the stellar debris. Additionally, in the case of the polytropic halo, and thanks to the dense and compact fermion-core, it can provide a good alternative to the black hole scenario in SgrA*. Finally we show that both models fail to reproduce the exact phase-space distribution of stars through the end of the leading arm of the Sgr stream, conclusion which is shared by former analysis using spherically symmetric haloes.

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