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Numerical simulations of Galactic dark matter substructure and implications for indirect detection

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Recent ultra-high resolution numerical simulations of the formation of the dark matter component of a galaxy like our Milky Way have revealed a staggering abundance of gravitationally self-bound dark matter subhalos, remnants of the hierarchical merging process that is the hallmark of the cold dark matter paradigm of cosmological structure formation. This substructure has important consequences for indirect detection efforts that aim to detect the products of dark matter pair-annihilations or decays. Massive subhalos hosting luminous dwarf satellite galaxies are promising targets for the Fermi Gamma-ray Space Telescope and Atmospheric Cerenkov Telescopes. Lower mass, dark subhalos, devoid of any stellar component, are tantalizing sources for all-sky blind surveys. Lastly, the cumulative effect of an unresolved population of low mass subhalos can significantly enhance the total luminosity of the host halo, the so-called "substructure boost factor." In this talk, I will review how extremely high resolution numerical simulations can inform our expectations of the observational consequences of dark matter substructure.