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Polarized solitons in higher-spin dark matter

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Apart from the Standard Model, our Universe could be host to a diverse set of degrees of freedom (dark sector). The dark sector could comprise of various bosonic fields with possible self interactions alongside gravity, containing macroscopic/astrophysical bound states known as solitons. Depending upon the spin nature of the field, these solitons can even carry huge amounts of intrinsic spin polarization!, leading to interesting phenomenology. In this talk, I will discuss such solitons arising in spin-1 and higher fields, including Yang-Mills theories in the Higgs phase. For masses in the fuzzy dark matter regime, such 'spinning'solitons may form the cores of dark matter halos, with halos in general being distinguishable from their scalar counterparts. Time permitting, I will also present a possible thermal production scenario of spin-1 fields (with or without self interactions) that can constitute all of the observed DM.

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