Contribution ID: **150** Type: **not specified**

Dark Solar Wind

Tuesday 10 May 2022 14:45 (15 minutes)

We study the solar emission of light dark sector particles that self-interact strongly enough to self-thermalize. The resulting dark fluid accelerates under its own thermal pressure and attains highly relativistic bulk velocities in the solar system. Compared to the ordinary free-streaming scenario, the local dark outflow has a much higher number density and correspondingly a much lower average energy per particle. We show how this generic phenomenon arises in a dark sector comprised of millicharged particles strongly self-interacting via a dark photon. The dark plasma wind emerging in this model has novel yet predictive signatures that can be probed in upcoming experiments. This opens up a new pathway for probing light dark sector particles and is a first step toward exploring more general dark fluid outflows originating from other astrophysical systems.

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Session Classification: DM III