Contribution ID: **163** Type: **not specified**

A new production mechanism for dark photons

Tuesday 9 May 2023 17:00 (15 minutes)

We introduce a mechanism by which a misaligned ALP can be dynamically converted into a dark photon in the presence of a background dark magnetic field. An abundance of non-relativistic ALPs will produce dark photons with momentum of order the inhomogeneities in the background field; therefore a highly homogeneous field will produce non-relativistic dark photons without relying on any redshifting of their momenta. The analysis naturally splits into two regimes. In the large field regime the dark photons exhibit the 'gliding' phenomena in which their energy density decays slower than matter. In the smaller field regime the energy density converts to dark photons, and during a time in which one would naively assume the field is frozen by Hubble friction, the energy density decays like radiation.

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Session Classification: Axion III

Track Classification: Axion and ALP