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# Axion-like particles from light primordial black holes

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We consider a cosmological scenario in which the very early Universe experienced a transient epoch of matter domination due to the formation of a large population of primordial black holes (PBHs) with masses $M \leq 10^9$ g, that evaporate before Big Bang nucleosynthesis. In this context, Hawking radiation would be a non-thermal mechanism to produce a cosmic background of axion-like particles (ALPs). We assume the minimal scenario in which these ALPs couple only with photons. In the case of ultralight ALPs ($m_a \leq 10^{-9}$ eV) the cosmic magnetic fields might trigger ALP-photon conversions, while for masses m a 10 eV spontaneous ALP decay in photon pairs would be effective. We investigate the impact of these mechanisms on the cosmic X-ray background, on the excess in X-ray luminosity in Galaxy Clusters, and on the process of cosmic reionization. We outline possible developments of this scenario including BH rotation and superradiance.

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