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ALP-portal heavy neutrino dark matter

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Axion like particles(ALPs) and right handed neutrinos-(RHNs) are two well-motivated dark matter(DM) candidates. However, these two particles have a completely different origin. Axion was proposed to solve the Strong CP problem, whereas RHNs were introduced to explain light neutrino masses through seesaw mechanisms. We study the case of ALP portal RHN DM taking into account existing constraints on ALPs. We consider the leading effective operators mediating interactions between the ALP and SM particles and three RHNs to generate light neutrino masses through type-I seesaw. Further, ALP-RHN neutrino coupling is introduced to generalize the model which is restricted by the relic density and indirect detection constraint.

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