

The current research on the axion DM and the future work

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Abstract of current research

I have investigated the axion dark matter (DM) by considering the quantum fluctuation during inflation.

As a result, I obtained the correlation between the energy scale of inflation and the axion DM mass.

Interestingly, if the axion couples to photons, a characteristic peak may appear in the spectrum of the diffuse photon flux.

This work will be finished soon!

Research plan

It is possible to explain various cosmological problems by introducing axion!!

Axions can be related with various themes in particle physics and cosmology.

e.g. Dark matter, Dark energy, Inflation,
Astrophysical object, and so on

As a first step, I focussed on the axion dark matter in the current work.

What is next?

Research plan

I plan to consider the axion DM coupling to hidden photons and its effect on the universe.

e.g. Relaxing H_0 -tension by introducing hidden photons as dark radiation

I also examine the property of axions and hidden photons through this plan.

Goal in my research plan

I would like to construct a cosmological scenario with axions and hidden photons, and suggest the detectability of them.

About the research abroad

Definite plan

Mar. 2020. Munich, Germany (2 weeks stay)
Workshop, Axion Cosmology

Undetermined plan

Jul. 2020. Humburg, Germany
Summer school

I plan to study with A. Ringwald (DESY) and G. Raffelt (Max-Planck).