ECU meeting: EPFL/CERN/UNIGE Joint Encounters

Report of Contributions

https://indico.cern.ch/e/798101

Contribution ID: **1** Type: **not specified**

Novel Ways to Hunt Axion Dark Matter: Observation and Experiment

Wednesday, 27 February 2019 09:30 (1 hour)

Identification of dark matter has been an outstanding problem for decades, and axion (or axion like particles) is one of the most popular dark matter candidates. A number of observations and experiments have tried to detect axion by using the axion-photon conversion by assuming the axion is coupled to photon, while no signal yet to be found. In this talk, I will discuss new techniques to search for axion dark matter (ADM) by focusing on another phenomena, birefringence, which is caused by the same coupling. The polarimetry observation of protoplanetary disks puts the best constraint on ADM for fuzzy dark matter mass (m = 10ˆ{-22}eV). I also propose a laser-cavity experiment which can improve the sensitivity by several orders of magnitude in the intermediate mass range (10ˆ{-17}eV < m < 10ˆ{-12}eV).

Presenter: FUJITA, Tomohiro

Contribution ID: **2** Type: **not specified**

Dark Matter, First Light

Wednesday, 27 February 2019 10:45 (45 minutes)

Dark matter forms the foundation for all cosmic structure, and its fundamental nature is one of science's most pressing enigmas. As we search for the most distant galaxies in the universe with radio and infrared observations, we are in a position to explore the particle physics of dark matter —the possibility of annihilation, decay, or other particle interactions —through its effects on early stars and galaxies. I will give an update on the quest to identify dark matter both in the lab and in the sky, major unsolved problems in dark matter theory, and how upcoming observations of the epoch of the first cosmic structures can be used to open a new window on the dark universe.

Presenter: MACK, Katie

Contribution ID: **3** Type: **not specified**

Why we should stop talking about the expansion of space

Wednesday, 27 February 2019 11:45 (45 minutes)

A popular stand about the interpretation of cosmic expansion is the following: « [⋯] expansion redshift are produced by the expansion of space between bodies that are stationary in space. » [Harrison (2000)]. Most of us have been taught cosmology that way, and we naturally tend to replicate this message, notably in public outreach—think of the ubiquitous analogy of the inflating balloon. The same thing happens with gravitational waves, which are often referred to as « ripples in space-time », which stretch distances as they propagate. The concept of an « expanding space » is, however, in blatant contradiction with the fundamental principles of relativity. In this talk, I will argue that it is both unnecessary and dangerous for our intuitive understanding of the world. As such, we should abandon it.

Presenter: FLEURY, Pierre