UNIVERSIDAD TECNICA
FEDERICO SANTA MARIA

Departamento de Física

Seminario Grupo de Física de Altas Energías

"From WIMPs to FIMPs with Low Reheating Temperatures"

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Abstract

Weakly- and Feebly-Interacting Massive Particles (WIMPs and FIMPs) are among the best-motivated dark matter (DM) candidates. In this paper, we investigate the production of DM through the WIMP and FIMP mechanisms during inflationary reheating. We show that the details of the reheating, such as the inflaton potential and the reheating temperature, have a strong impact on the genesis of DM. The strong entropy injection caused by the inflaton decay has to be compensated by a reduction of the portal coupling in the case of WIMPs, or by an increase in the case of FIMPs. We pinpoint the smooth transition between the WIMP and the FIMP regimes in the case of low reheating temperature. As an example, we perform a full numerical analysis of the singlet-scalar DM model; however, our results are generic and adaptable to other particle DM candidates. Interestingly, in the singlet-scalar DM model with low-reheating temperature, regions favored by the FIMP mechanism are already being tested by direct detection experiments such as LZ and XENONnT.

Miércoles 9 de Octubre de 2024 a las 14:30 horas de Chile.

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