Cosmic superstrings in the early universe

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Abstract

In this talk, we will discuss the consequences that moduli-dependent tensions of cosmic superstrings have on their evolution. Moduli dynamics are motivated in the early universe after inflation ends when moduli can find themselves displaced from their final vacuum and rolling down steep potentials. In particular, as the volume modulus rolls towards larger values, the tension of cosmic super-strings will decrease leading to their growth. During a volume modulus kination era, this growth is fast enough to allow for the possibility of percolating cosmic string networks. Next, we will see how this same dependence of their tension on the modulus leads to surprising dynamics, where phases with a significant amount of the total energy density of the universe in the form of cosmic superstring loops become attractors of the system. Finally, we will study the gravitational signal expected from these scenarios in which the gravitational waves are able to avoid part of the dilution of expected early moduli dominated eras, and which presents a peak in the GHz regime.

Keywords: Cosmic super, strings, early universe, moduli evolution

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