Report

On Dark Matter & a Pion Phase Transition

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Abstract
This is a brief report on Dark Matter & a pion phase transition in light of the recent developments.

Keywords: Dark Matter, flattening curve, pion, phase transition.

1. A new article published in Nature raises serious questions about Dark Matter [1]. A team lead by Reinhard Genzel of the Max Planck Institute for Experimental Physics, using the 8.2 meter very large telescope in Chile came up with a surprise: Some galaxies which are ten billion years old, born when the universe was just one fifth of its current age did not display the flattening rotation curves which are a hallmark of Dark Matter, as is well known. Rather they displayed the normal rotation curves which can be attributed to Keplarian orbits with decreasing velocities

$$V \propto \frac{1}{\sqrt{r}} \tag{1}$$

The conclusion is that Dark Matter developed in galaxies as the universe aged.

Alternatively this supports the herein author's model (Cf. refs.[2],[3],[4] and [5]) that Dark Matter is an artifact of a gravitational constant that slowly decreases with the age of the universe according to

$$G = \frac{G_0}{T} \tag{2}$$

It must be noted that even after more than 75 years, there is no identity for Dark Matter.

So if (2) is correct, then in the very early universe we had the usual value of G but as time progressed G reduced and this shows up as Dark Matter.

2. The production of hadrons can be attributed to a phase transition following from the herein author's Planck oscillator model (Cf. refs. [6], [7], [5]). In this approach the starting point is a series of oscillators at the Planck scale which lead to the Compton wavelength on the one hand

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and the Hagedorn temperature on the other. It is well known that in the Hagedorn theory, hadrons "condense" at this temperature. So the picture would be that Planck oscillators, which are Planck scale black holes of the quantum vacuum would together form hadrons. In this case the Hagedorn temperature defines the phase transition which should lead from the Planck scale initial "foam" to other strongly interacting particles.

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