Dark matter from primordial metric fields and the term (grad g_{00})^2

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It is a well-known truism, inspired on the general theory of relativity, that gravity gravitates. Here we suggest the possibility that dark matter may be caused by the gravitation of the metric. At first sight this seems impossible since the gravitational fields in galaxies and cumuli are so weak that it would seem that second order terms are negligible. Nevertheless, the general theory of relativity tells us that the gravitation due the metric is given by (grad g_{00})^2. Thus, a metric field g_{00} varying fast in the space directions could make a sizeable contribution to the gravitational field despite being a weak field. As a plausible source of such a field consider that during reheating the inflaton field disintegrates into radiation. Those quantum decays that involve higher energies and momenta will produce pockets of metric fields with rapid change in time and space. The expansion of the universe and dissipative processes (including the emission of gravitational waves) eventually result in basically stationary pockets of classical g_{00} field varying rapidly in space that have collapsed along with matter into structures like galaxies and cumuli. These pockets should gravitate precisely by the term mentioned above. They are classical fields and are reminiscent of the cosmic fields that are scattered in our universe.

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