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ON INTERACTION OF GRAVITATIONAL WAVES WITH NON-INTERACTING PARTICLES IN THE INTERSTELLAR MEDIUM**A. A. A. M. Amarasinghe¹, T. Wickramasinghe²**¹*Department of Physics, Faculty of Science, University of Peradeniya*²*Department of Physics, The College of New Jersey, USA*

Most astrophysical objects generate gravitational waves which produce space-time distortions. The space-time distortion due to gravitational waves can lead to displacements in positions of non-interacting particles in interstellar gas clouds. This phenomenon may lead to form denser regions within gas clouds. These density enhancements eventually may lead to induce seeds for the formation of new stars. Weak field metric in linearized general relativity was used to derive an equation for the change in density of a gas cloud as a function of time. This equation was then used in various astrophysical situations involving gravitational waves such as gravitational wave diffraction and gravitational bursts with memory. Density enhancements of such situations in interstellar gas clouds with typical density of 10^6 molecules per cm^3 were investigated using the equation (1).

The density equation with its implementation to stellar astrophysics leads to new insights for the induction of star formation within interstellar gas clouds in the vicinity of gravitational wave sources.

$$\rho_C \approx \rho \left[1 + \frac{1}{2} (h_{11} + h_{22}) \right] \quad (1)$$