



High Energy Physics - Phenomenology

Gravipulsons

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We search for self-gravitating oscillating field lumps (pulsons) in the scalar model with logarithmic potential. With the use of a Krylov-Bogoliubov-type asymptotic expansion in the gravitational constant, the pulson solutions of the Einstein-Klein-Gordon system are obtained in the Schwarzschild coordinates. They are expressed in terms of solutions of the singular Hill's equation. The masses of the obtained pulsons are calculated. The initial conditions are found under which the pulson solutions become periodic. These conditions are then used in direct numerical integration of the Einstein-Klein-Gordon system. It is shown that they do evolve into a very long-lived periodic pulson. Stability of the self-gravitating pulsons and their possible astrophysical applications are briefly discussed.

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