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Stability Analysis of Mixed Stars

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An analysis of the parameter space that characterizes the possible limit of the collapse of a real scalar field with spherical symmetry coupled with matter in a linear way and under two types of constitutive equations (linear and polytropic) is carried out. The methodology for obtaining the solutions involves adjusting the relationships between the energy density of matter (fixed in advance) and the central value of the scalar field (searched) in such a way that the solution of the scalar field shows Yukawa potential-like behavior. This relationship is plotted for different values of the coupling constant. Then the different mass values are obtained and subjected to the necessary stability conditions. For the stability criteria, the weak energy condition and the fact that the total mass of the system increases with the growth of the energy density at the origin, among others, are used.

Author: GARCÍA, Carlos Manuel

Presenter: GARCÍA, Carlos Manuel

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