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A stability analysis of the static EKG Boson Stars

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An analysis is realized on the stability of the recently proposed static solutions of Boson Stars. These solutions of Einstein-Klein-Gordon (EKG) equations arise from considering the interactions of a real scalar field with matter. We assumed that the inclusion of the scalar field in addition with matter, allows to justify that stability implies the total mass of the solution should grow when the initial condition for the density of matter at the origin is also increased. We uses a linear relation concerning to the scalar field in the energy density as well as for this and the pressure, with this we found the relation between the scalar field in the origin and matter energy density in the same point. We also determine the behavior of the total mass with the matter energy density in the origin determining through this, and the weak energy condition, two possible ranges for stable solutions of static boson stars.

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