Contribution ID: **12** Type: **Talk**

Boson stars solutions of the Einstein-Klein-Gordon equations in the sense of Colombeau-Egorov's theory of generalized functions

Friday, 12 May 2017 09:00 (20 minutes)

We present static spherically symmetric solutions of the equations of motion of a scalar field interacting with gravity (EKG equations) in the Colombeau-Egorov's sense of generalized functions. The scalar fields are confined within the interior region and the exterior fields are purely gravitational and coinciding with the Schwarzschild ones. The solution resembles the so called "gravastars" which had been discussed in the literature, where the scalar field plays a similar role as a varying cosmological constant, satisfying the Klein-Gordon equation. It is also argued that the usual "gravastar" solutions (corresponding to DeSitter internal space) also solve the Einstein equations in the Egorov's sense, but requiring the existence of an external infinite surface tension at the boundary. The presented solutions of the EKG equations open a possibility for the existence of static boson stars. The argue is based in designing a one parameter ϵ dependent family of radial dependencies of the metric and the scalar field, being infinitely differentiable. Afterwards, it is shown that in the limit $\epsilon \to 0$, the EKG equations are satisfied in the sense of the generalized functions. The solutions exhibit properties which qualitatively support their physical meaning. For example close to the boundary at the interior, the scalar field energy density piles up toward to the limit surface. On the other hand, also close to the separation surface, but on the outside, the known "non-hair" theorem, indicates that any scalar field perturbation also tends to be attracted to the boundary.

Primary authors: Dr CABO MONTES DE OCA , Alejandro (Instituto de Cibernetica, Matematica y Fisica (ICIMAF), La Habana, Cuba); SUAREZ FONTANELLA , Duvier (Facultad de Fisica, Universidad de La Habana, Cuba); Dr CABO-BIZET, Nana Geraldine (Division de Ciencias Exactas e Ingenierias, Campus Leon, Universidad de Guanajuato, Leon, Mexico)

Presenter: SUAREZ FONTANELLA , Duvier (Facultad de Fisica, Universidad de La Habana, Cuba)

Track Classification: STARS2017