Contribution ID: **109** Type: **Talk**

Duration of classicality of the axion dark matter condensate

Thursday, July 26, 2018 3:40 PM (20 minutes)

Axion dark matter is commonly considered as a classical self-interacting scalar field condensate. This talk takes the axion as a quantum scalar field and shows how long the classical description is valid considering gravitational and contact self-interactions. When the axion field is homogeneus and interacts with itself by attractive forces, parametric resonance causes quanta to jump in pairs out of the condensate into all modes with wave vector less than some critical value. Although these instabilities do not occur for repulsive contact interaction in the homogeneous case, they do so for the inhomogeneous case. In every unstable case, the time of classicality is calculated.

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Session Classification: 4.4 Axions

Track Classification: Theory