



Contribution ID: 101

Type: **not specified**

## Solitons and halos for self-interacting scalar dark matter

*Friday, 5 May 2023 18:00 (20 minutes)*

We study the formation and evolution of solitons supported by repulsive self-interactions inside extended halos, for scalar-field dark matter scenarios. We focus on the semiclassical regime where the quantum pressure is typically much smaller than the self-interactions. We present numerical simulations, with initial conditions where the halo is described by the WKB approximation for its eigenfunction coefficients. We find that when the size of the system is of the order of the Jeans length associated with the self-interactions, a central soliton quickly forms and makes about 50% of the total mass. However, if the halo is ten times greater than the Jeans length, a soliton only forms in cuspy halo where the central density is large enough to trigger the self-interactions. There is no preferred soliton mass, which suggests cosmological halos would show a large scatter for their soliton mass, depending on their assembly history.

**Primary authors:** VALAGEAS, Patrick (CEA); BRAX, Philippe (CEA Saclay); GALAZO, Raquel

**Presenter:** GALAZO, Raquel

**Session Classification:** Astrophysical messengers of fundamental physics: Contributed talks