Contribution ID: **23** Type: **Contributed Talk**

Glueball Dark Matter revisited

Thursday 5 January 2023 17:35 (15 minutes)

We revisit the possibility that Dark Matter is composed of stable scalar glueballs of a confining dark $\mathrm{SU}(3)$ gauge theory coupled only to gravity. The relic abundance of dark glueballs is studied for the first time in a thermal effective theory accounting for strong-coupling dynamics. An important ingredient of our analysis is the use of an effective potential for glueballs that is fitted by lattice simulations. We predict the relic abundance to be in the range $0.12\zeta_T^{-3}\Lambda/(137.9eV) < \Omega h^2 < 0.12\zeta_T^{-3}\Lambda/(82.7eV)$, with Λ being the confinement scale, ζ_T the visible-to-dark sector temperature ratio and the uncertainty is coming from the fit to lattice data. This prediction is an order of magnitude smaller than the existing glueball abundance results in the literature. Our framework can be easily generalised to different gauge groups and modified cosmological histories paving the way towards consistent exploration of strongly-coupled dark sectors and their cosmological implications.

Authors: SALINAS, Gustavo (Stockholm U., OKC); CARENZA, Pierluca (Stockholm U., OKC); PASECHNIK, Roman (Lund university); WANG, Zhi Wei (Lund U., Dept. Theor. Phys.)

Presenter: PASECHNIK, Roman (Lund university)

Session Classification: Contributed Talks III

Track Classification: Dark matter theory/phenomenology