

## Joint seminar of the NPI of the CAS

12. 6. 2024

### Roman Pasechnik (Lund University): Glueball dark matter

Abstract:

We delve deeper into the potential composition of dark matter as stable scalar glueballs from a confining dark  $SU(N)$  gauge theory, focusing on  $N = \{3,4,5\}$ . To predict the relic abundance of glueballs for the various gauge groups and scenarios of thermalization of the dark gluon gas, we employ a thermal effective theory that accounts for the strong-coupling dynamics in agreement with lattice simulations. We compare our methodology with previous works and discuss the possible sources of discrepancy. The results are encouraging and show that glueballs can account for the totality of dark matter in many unconstrained scenarios with a phase transition scale  $20 \text{ MeV} \lesssim \Lambda \lesssim 10^{10} \text{ GeV}$ , thus opening the possibility of exciting future studies.