



Contribution ID : 177

Type : Oral talk

Primordial black holes in chaotic inflation with the bumped potential (“trampoline”)

Thursday, 29 October 2026 09:30 (15)

Primordial black hole (PBH) production is investigated in a chaotic inflation model with a massive inflaton whose potential $V_0 + m^2 \varphi^2/2$ contains a localized bump. The presence of the bump temporarily slows down the inflaton motion and leads to high, narrow peaks in the density perturbation spectrum. The density perturbation spectrum and the resulting PBH mass function are calculated numerically, showing that the model can produce PBHs with characteristic masses around 10^{20} g.

Constraints on the PBH abundance arising from Hawking radiation and its heating of interstellar dust are further studied. The obtained PBH mass spectrum is approximated by a parabolic distribution, allowing the dependence of the constraints on the width of the mass function to be investigated. Both a homogeneous cosmological PBH distribution and a Navarro–Frenk–White Galactic halo distribution are considered. The resulting constraints are found to depend strongly on the width of the PBH mass function: broader mass functions are subject to substantially stronger constraints, while narrow mass functions around 10^{20} g can still allow a significant PBH contribution to dark matter.

Primary author(s) : Mr. MELIKHOV, Alexander (Institute for Nuclear Research of the Russian Academy of Sciences)

Presenter(s) : Mr. MELIKHOV, Alexander (Institute for Nuclear Research of the Russian Academy of Sciences)

Session Classification : Gravitation and cosmology

Track Classification : Gravitation and cosmology