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Particle Physics at LPTHE

Vendredi 10 Novembre 2023, 14 :00
LPTHE, Library and Zoom (link in the comments)(Zoom link : https ://cern.zoom.us/j/65247099606?pwd=UU5ob3Q4a0hpakJvbk5KK01DSVpqUT09)
Domaines : hep-ph

Titre : *Improved Constraints on Dark Matter Annihilations Around Primordial Black Holes*

Orateur : **Prolay Chanda (University of Illinois at Chicago)**

Résumé : *Cosmology may give rise to appreciable populations of both particle dark matter and primordial black holes (PBH) with the combined mass density providing the observationally inferred value* $\Omega_{\mathrm{DM}} \approx 0.26$. *However, previous studies have highlighted that scenarios with both particle dark matter and PBH are strongly excluded by* γ*-ray limits for particle dark matter with a velocity independent thermal cross section* $\langle \sigma v \rangle \sim 3 \times 10^{-26} \mathrm{cm}^3/\mathrm{s}$, *as is the case for classic WIMP dark matter. Here we examine the limits from diffuse* γ*-rays on velocity-dependent, including annihilations which are p-wave with* $\langle \sigma v \rangle \propto v^2$ *or d-wave with* $\langle \sigma v \rangle \propto v^4$, *which we find to be considerably less constraining. Furthermore, we highlight that even if the freeze-out process is p- wave it is relatively common for (loop/phase-space) suppressed s-wave processes to actually provide the leading contributions to the experimentally constrained* γ*-ray flux from the PBH halo. This work also utilizes a refined treatment of the PBH dark matter density profile.*
