

FIG. 1. Constraints on $|U_{eN}|^2$ as a function of the HNL mass m_N . Limits shown: K universality (Bryman-Shrock) [1], π universality (Bryman-Shrock) [1], ^{20}F β -decay [2], ATLAS W^\pm (2025) [3], ATLAS $t\bar{t}$ (2024) [4], ATLAS (2019) [5], ATLAS (2022) [6], ATLAS (2024) [7], ATLAS (2025) [8], BEBC (Barouki et al) [9], Belle [10], Borexino [11], CHARM [12], CMS (2018) [13], CMS (2022) [14], CMS (2024-I) [15], CMS (2024-II) [16], Cosmology [17], DELPHI (long) [18], DELPHI (short) [18], L3 (2001) [19], LSND (Ema et al) [20], NA62 [21], NA62 (π 2025) [22], PIENU (2017) [23], PMNS Unitarity [24], Super-Allowed β decays (Bryman-Shrock) [1], T2K [25], TRIUMF [26].

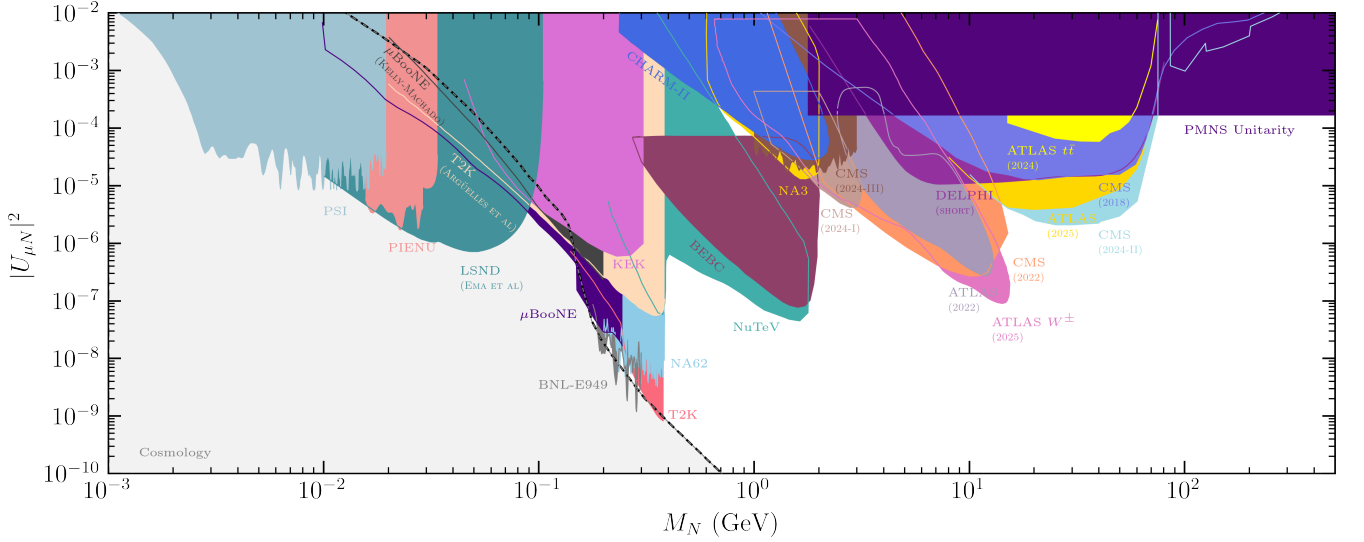


FIG. 2. Constraints on $|U_{\mu N}|^2$ as a function of the HNL mass m_N . Limits shown: μBooNE [?], μBooNE (Kelly-Machado) [27], ATLAS W^\pm (2025) [3], ATLAS $t\bar{t}$ (2024) [4], ATLAS (2019) [5], ATLAS (2022) [6], ATLAS (2025) [8], BEBC [28], BNL-E949 [29], CHARM-II [30], CMS (2018) [13], CMS (2018-dilepton) [31], CMS (2022) [14], CMS (2024-I) [15], CMS (2024-II) [16], CMS (2024-III) [32], CMS (8TeV) [33], Cosmology [17], DELPHI (short) [18], KEK [1], LSND (Ema et al) [20], NA3 [34], NA62 [35], NuTeV [36], PIENU [37], PIENU (low μ energy) [37], PMNS Unitarity [24], PSI [38], T2K [25], T2K (Argüelles et al) [39].

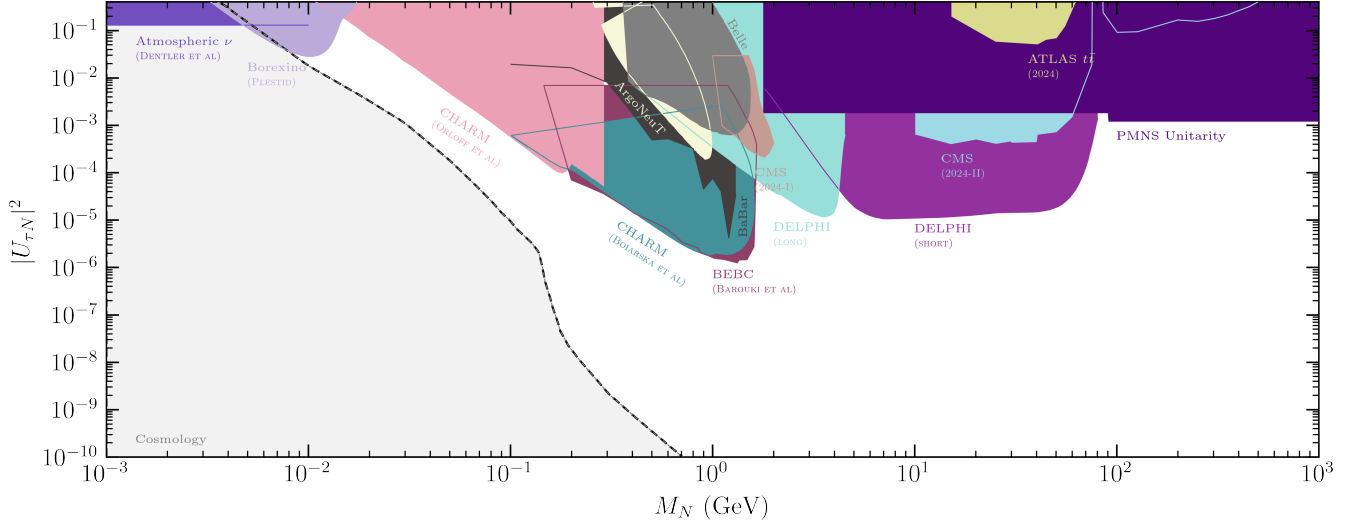


FIG. 3. Constraints on $|U_{\tau N}|^2$ as a function of the HNL mass m_N . Limits shown: ATLAS $t\bar{t}$ (2024) [4], ArgoNeuT [40], Atmospheric ν (Dentler et al) [41], BEBC(Barouki et al) [9], BaBar [42], Belle [43], Borexino (Plestid) [44], CHARM (Boiarska et al) [45], CHARM (Orloff et al) [46], CMS (2024-I) [15], CMS (2024-II) [16], Cosmology [17], DELPHI (long) [18], DELPHI (short) [18], PMNS Unitarity [24].

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