

# Looking for HNLs via Double Bang signals

Iván Martínez Soler

## Neutrino-Nucleus Interactions in the Standard Model and Beyond

Based on paper: Coloma, Machado, IMS, Shoemaker, Phys.Rev.Lett 119 (2017) 20, 201804,  
arXiv:1707.08573  
Atkinson, Coloma, IMS, Rocco, Shoemaker (2105.09357)

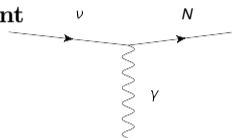
January 20, 2022



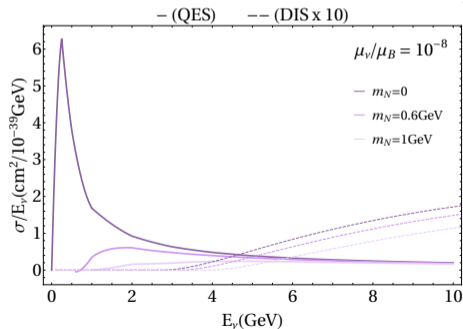
# Looking for HNLs via Double Bang signals

Double-Bang can be used to search for **new neutrino interactions**

Transition magnetic moment

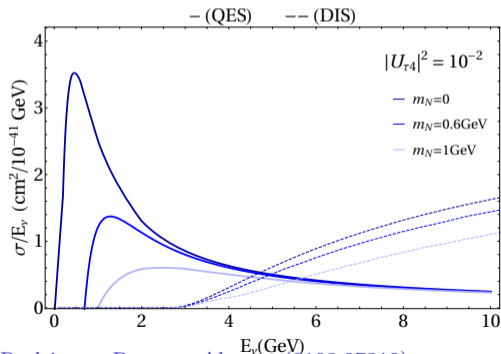


$$\mathcal{L} \supset -\mu_{\nu} \bar{N}_4 \sigma_{\mu\nu} P_L \nu_{\alpha} F^{\mu\nu}$$

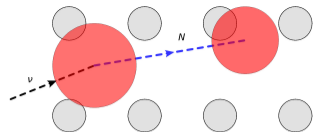


HNLs produced via **mixing with active neutrinos**

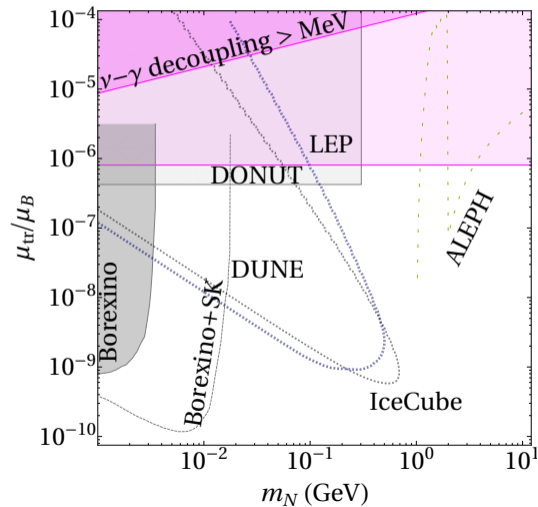
$$\nu_{\alpha L} = \sum U_{\alpha m} \nu_{mL} + U_{\alpha 4} N_{4L}$$



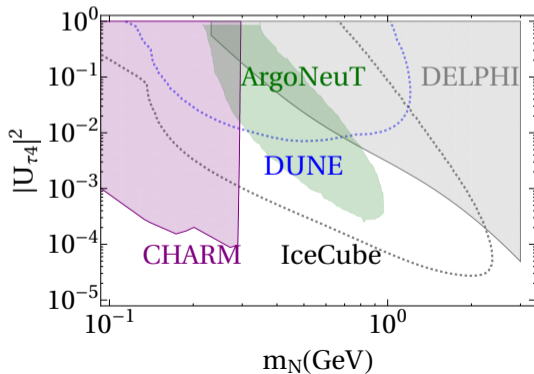
# Looking for HNLs via Double Bang signals



## Transition magnetic moment



## HNLs produced via mixing with active neutrinos



**Thank you!**

# Backup

DIS cross section for  $m_N = 0$

