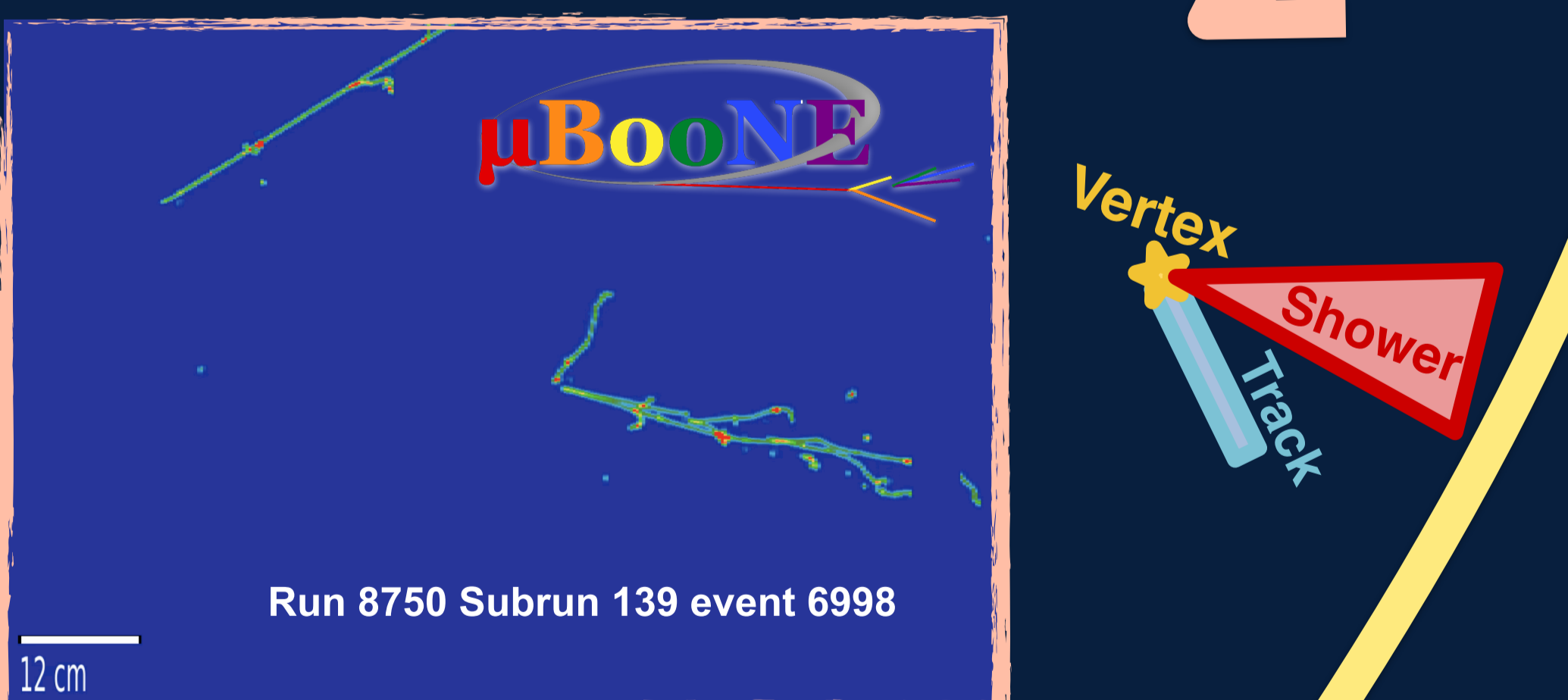
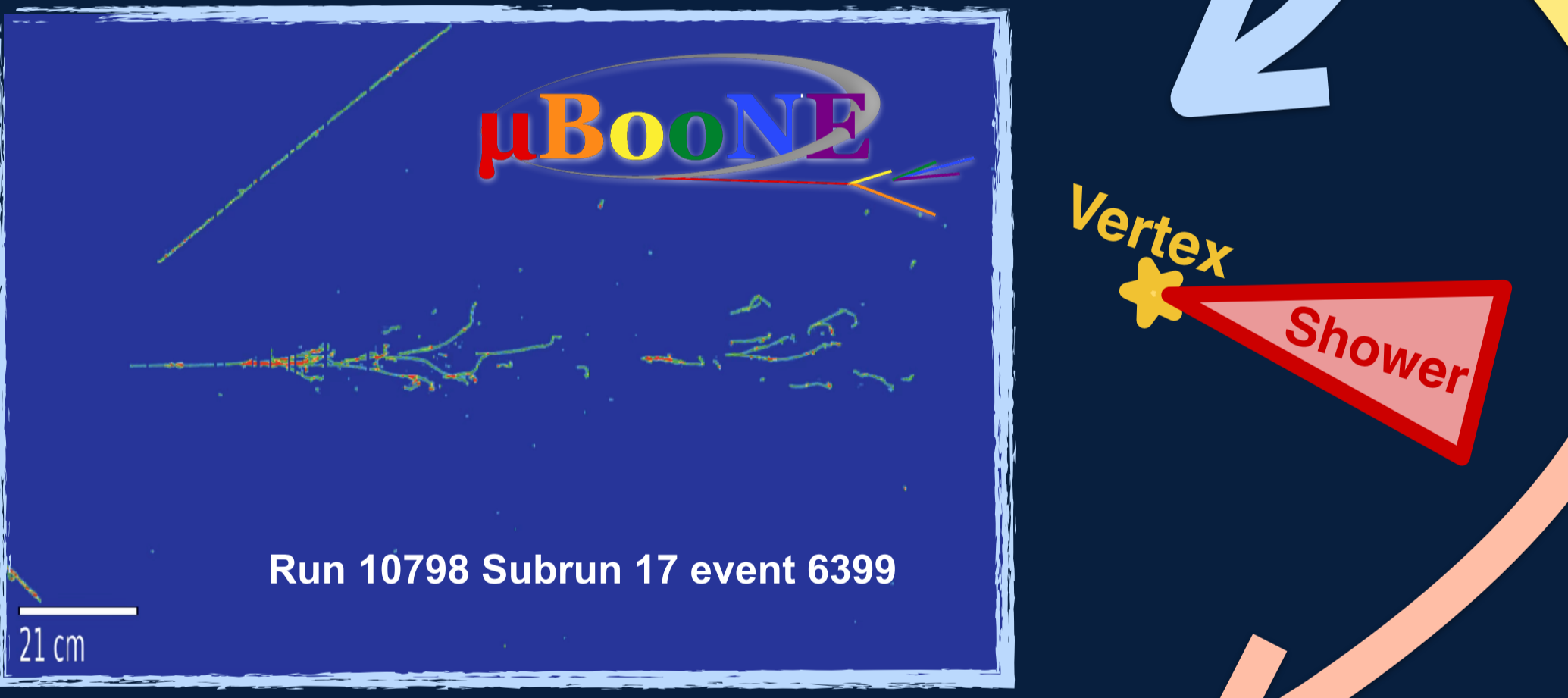
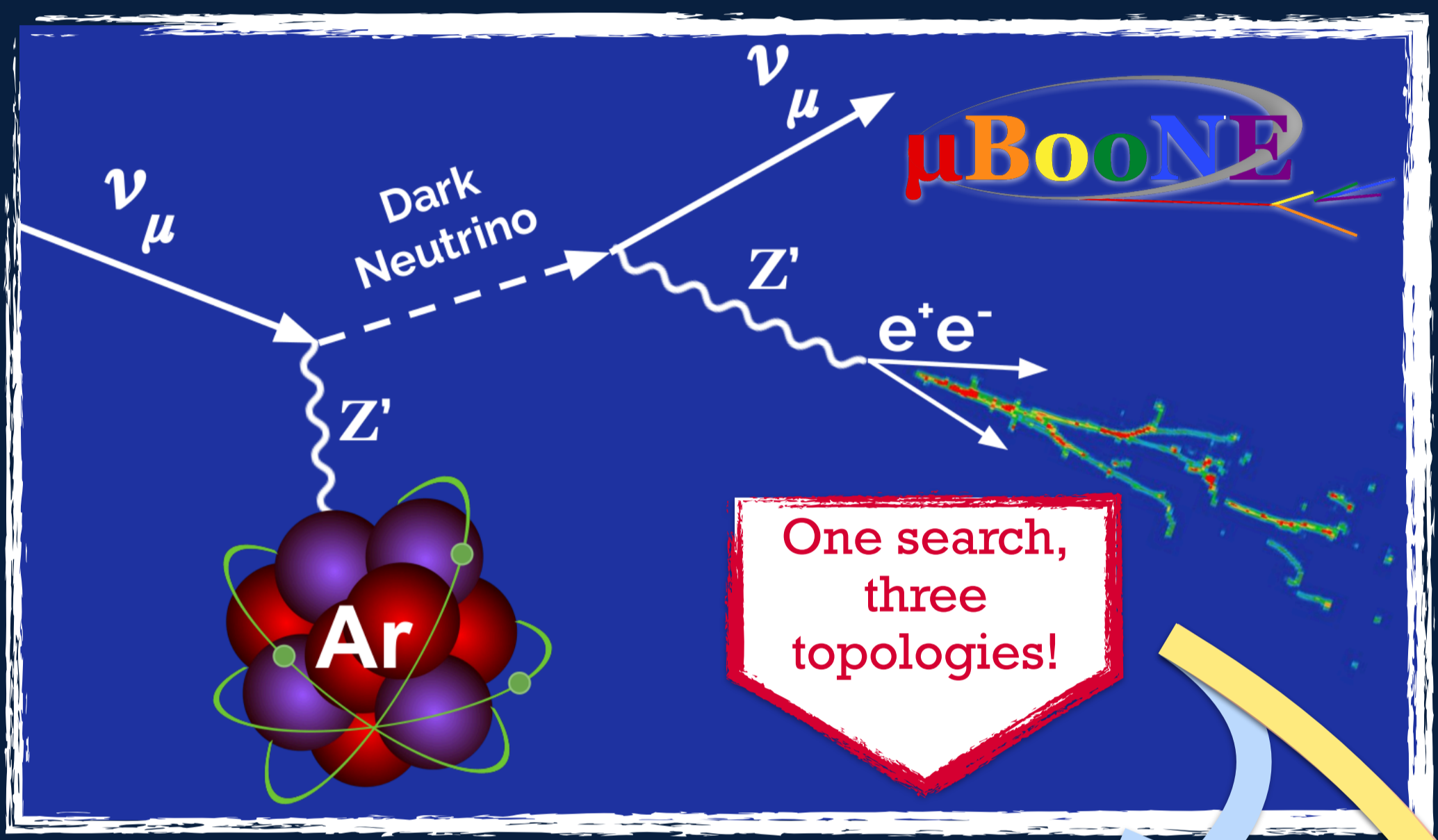


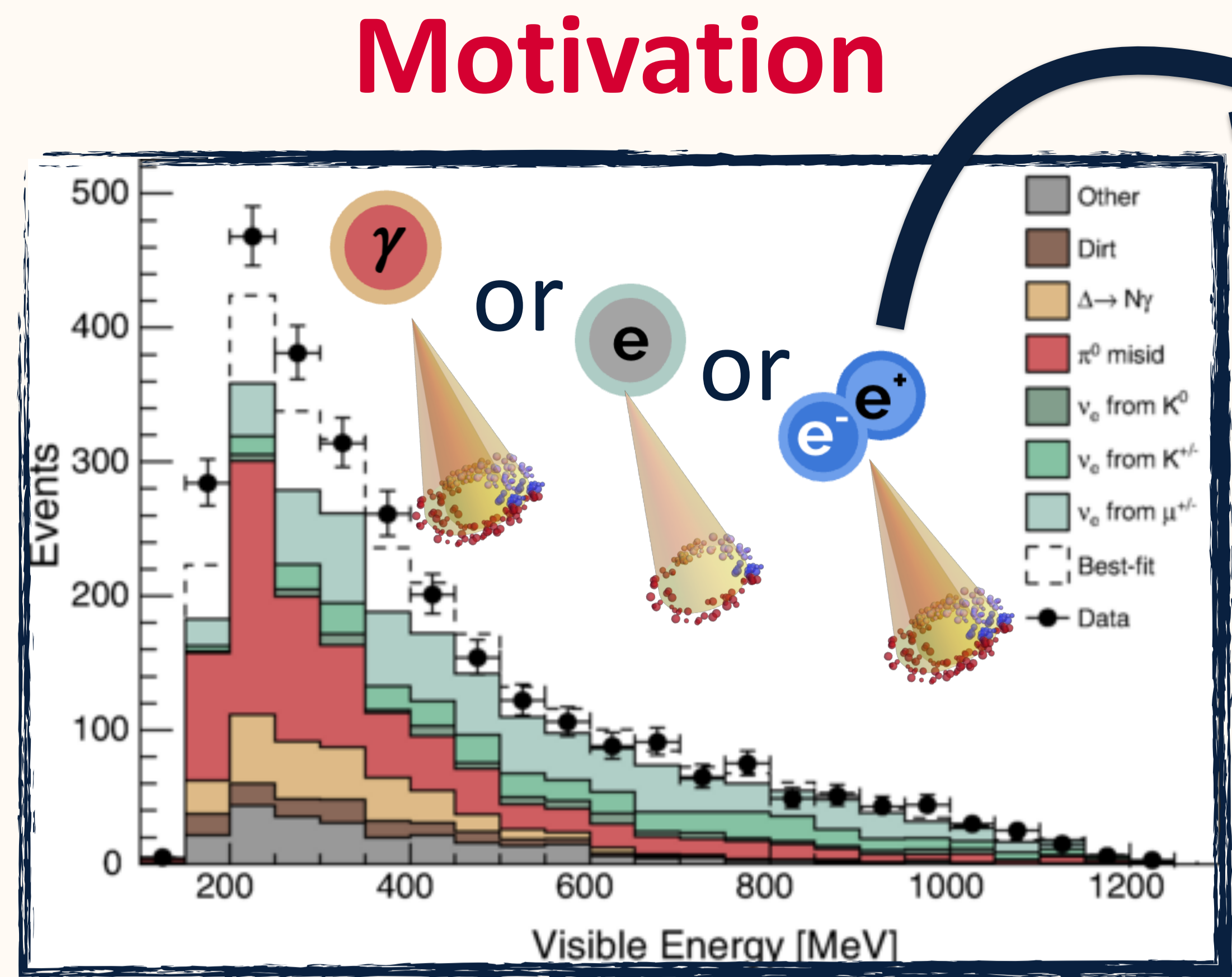
First Search for Dark Sector e^+e^- Explanations of the MiniBooNE Anomaly at MicroBooNE

THE UNIVERSITY OF EDINBURGH

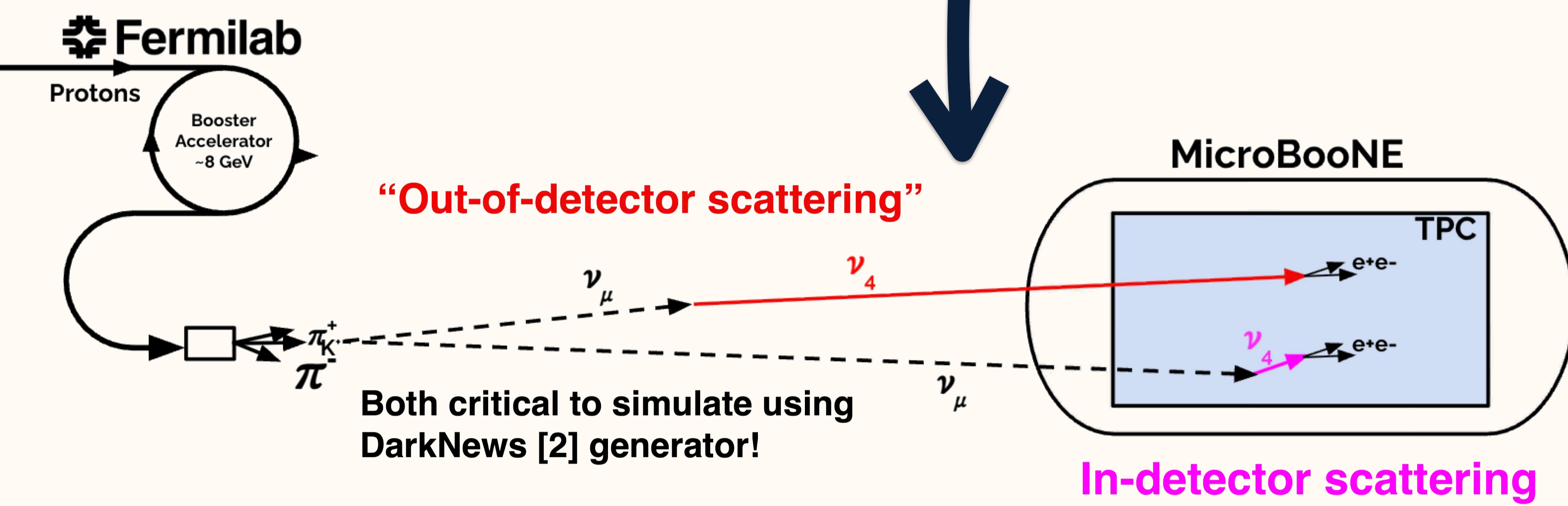
Vincent Basque (vbasque@ed.ac.uk)



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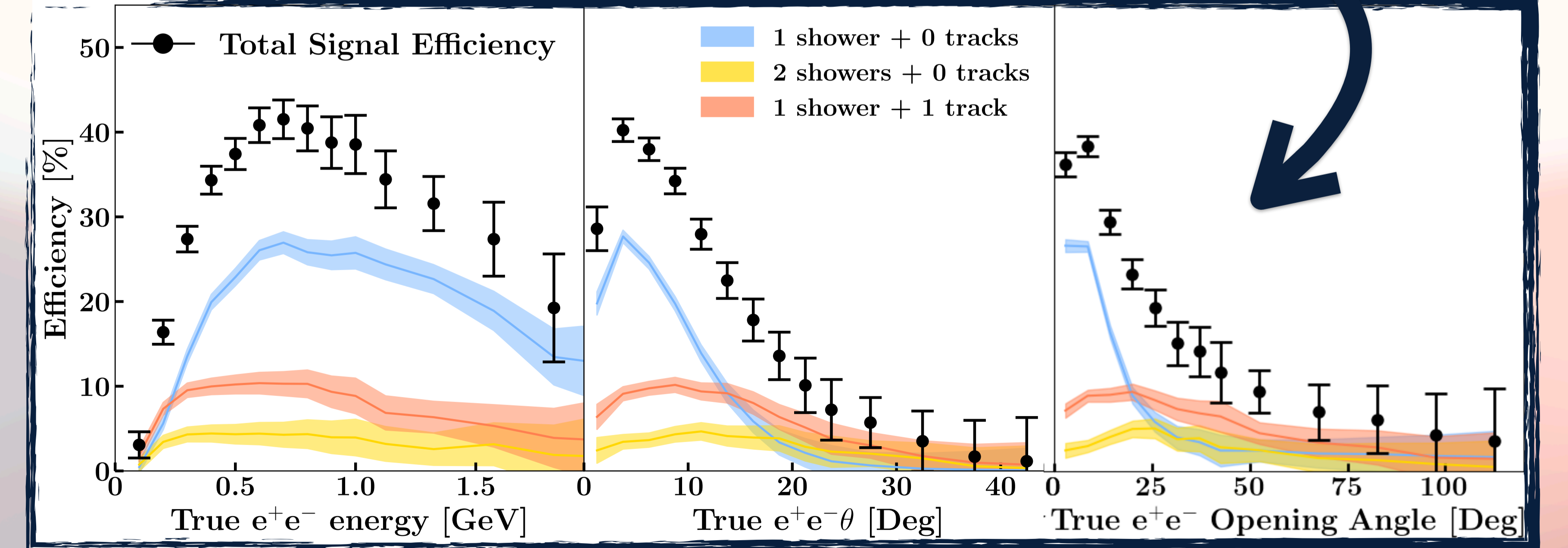


MiniBooNE low energy excess [1]
What could it be?



Hunting for e^+e^- pairs in MicroBooNE LArTPC

Coherent scattering through 3 complementary topologies!
Total efficiency ~20–40%!
Strongest for forward e^+e^- events!



See the full results & 2-dark neutrinos in **Phys. Rev. Lett. 136, 121804!**

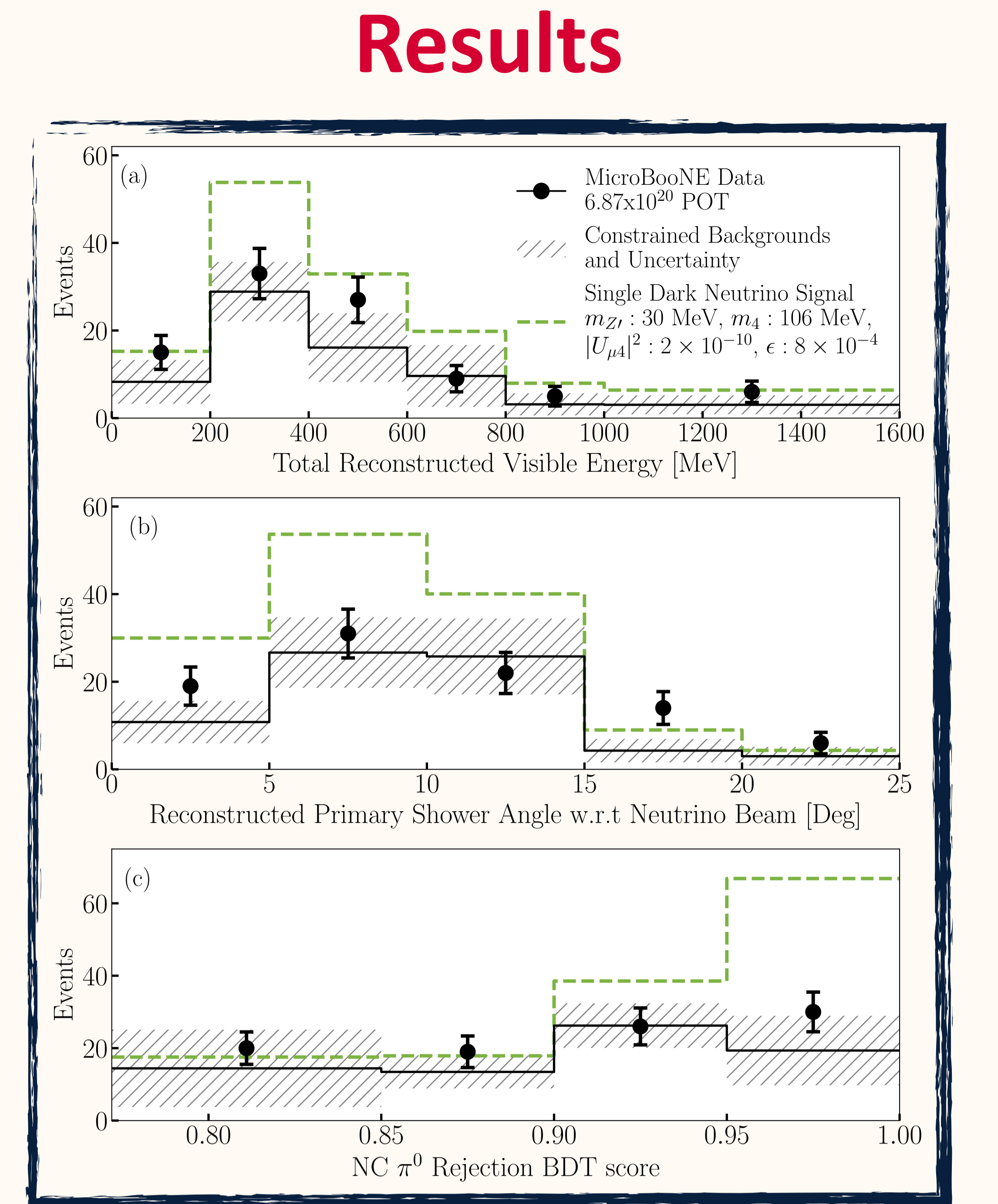
References
[1] MiniBooNE: [Phys. Rev. D 103, 052002](#)
[2] DarkNews: [Comput. Phys. Commun. 297 109075](#)

Dark neutrino Model

New dark neutrino ($\nu_{4/5}$) via two production mechanisms with new Z'

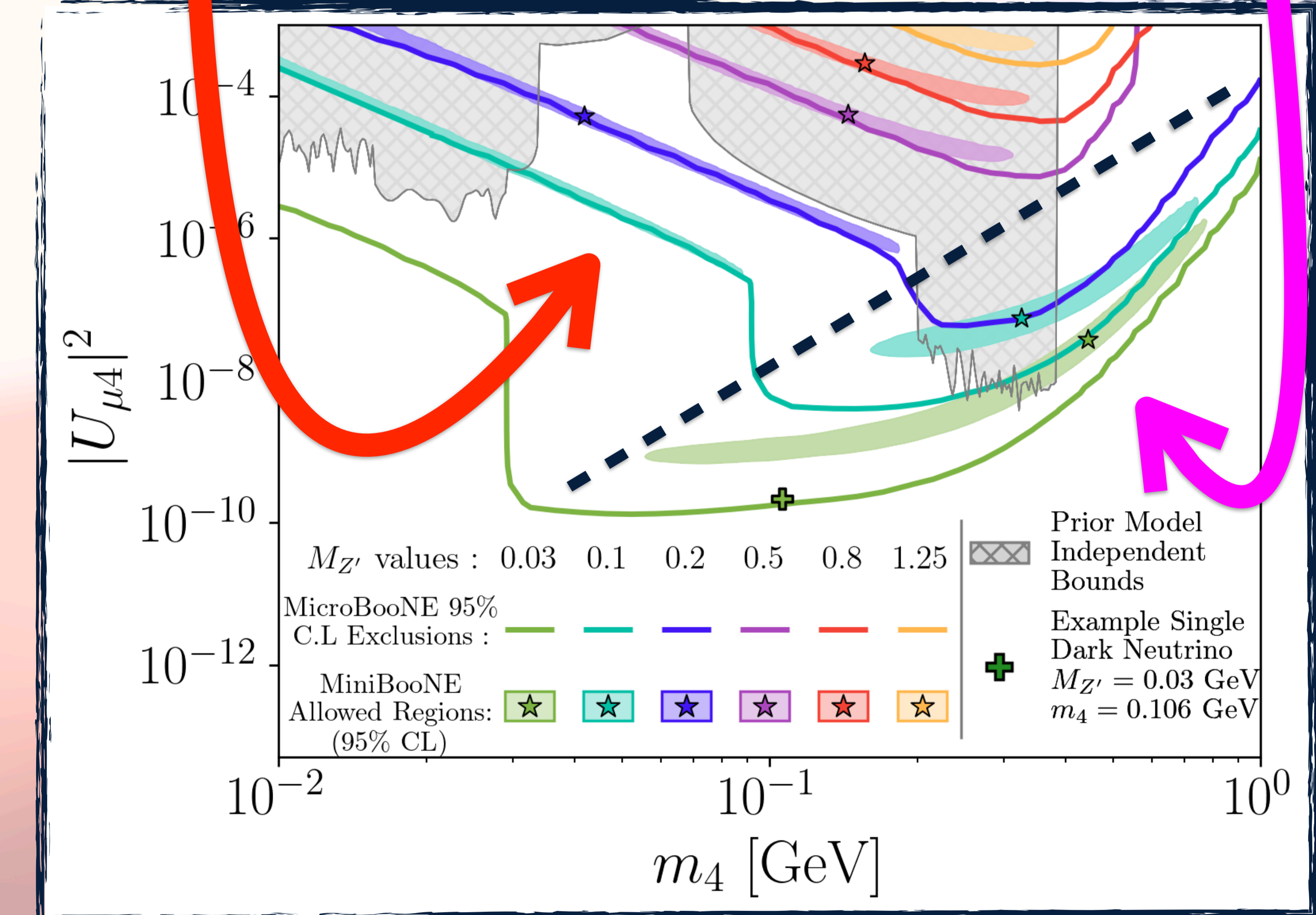
New single-dark neutrino:
 $\nu_4 \rightarrow \nu_\mu (Z' \rightarrow e^+e^-)$

Or 2-dark neutrinos:
 $\nu_5 \rightarrow \nu_4 (Z' \rightarrow e^+e^-)$



Data consistent with prediction at 1.5σ
Excludes 1-dark neutrino explanation of MiniBooNE at 95% C.L. for different $M_{Z'}$ (colour by colour)!

Out-of-detector scattering (Long Lifetime $c\tau \gg 1m$)
In-detector scattering (Short Lifetime $c\tau < 1m$)



Future upgrades will use 2× more data!
Extending to non-coherent scattering with improved reconstruction and background vetoes!