

not-so-inelastic Dark Matter (niDM)

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A SIMPLE UV-COMPLETE SUB-GEV WIMP MODEL

Majorana states:
Dark Matter candidates

$$\chi_D = \chi_R + \chi_L \xrightarrow{\text{SBB}} \chi, \chi^*$$

$$m_D \xrightarrow{\text{SBB}} \Delta_m m_\chi = m_{\chi^*} - m_\chi$$

dark photon:
new $U'(1)$ -force

A' with α' coupling

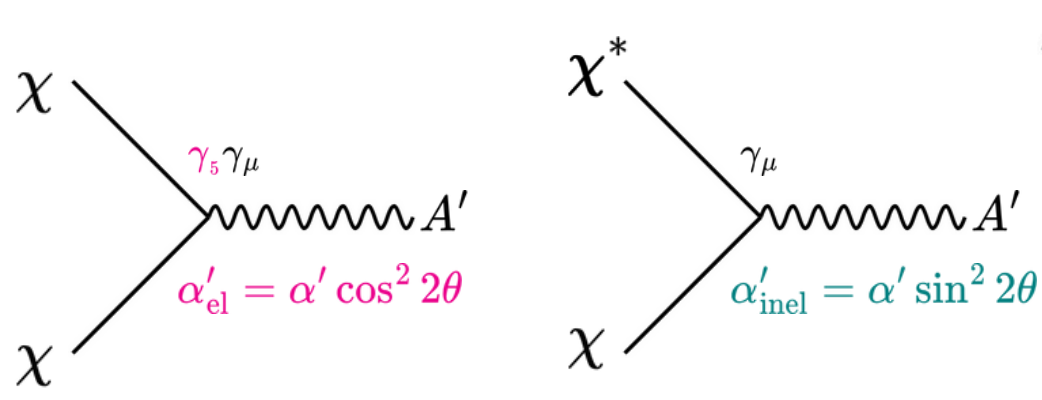
extra scalar field:
dark Higgs mechanism
spontaneous symmetry breaking (SSB)

$$\langle H' \rangle \xrightarrow{\text{SBB}} m_{A'}, m_L, m_R$$

$$\delta_y m_L = m_R - m_L$$

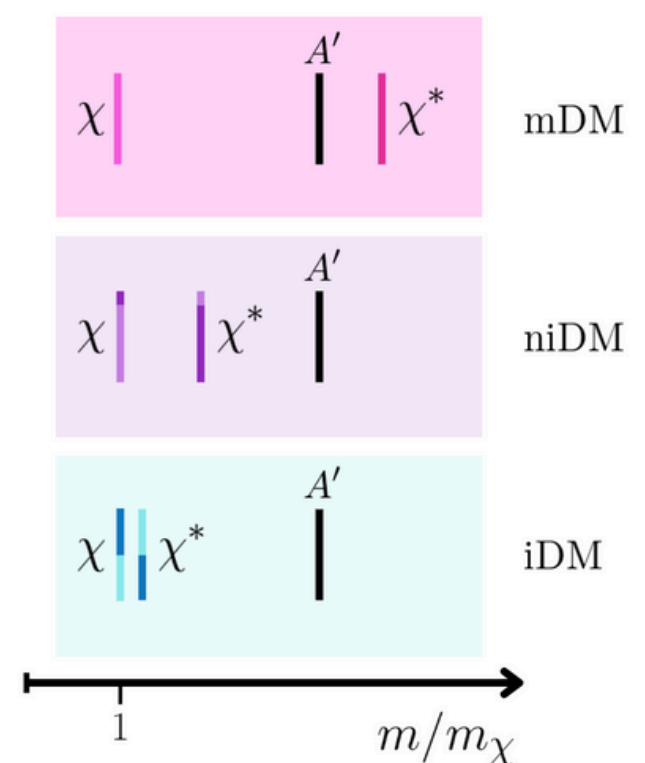
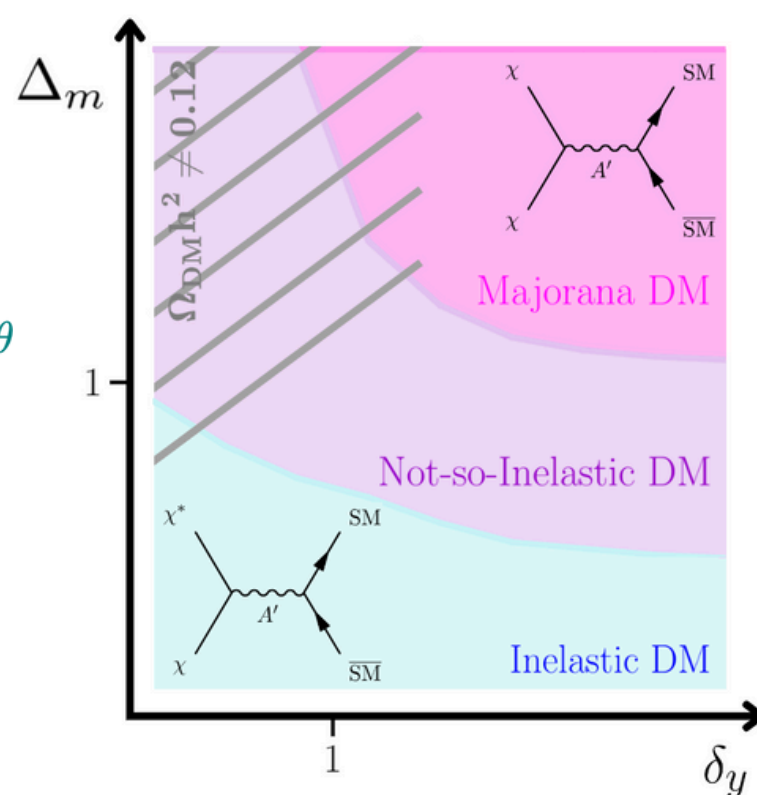
$m_{H'} > m_{\chi^*}, m_{A'}$

• Interactions within the Dark Sector



$$\cos 2\theta = -\frac{\delta_y \Delta_m}{(2 + \delta_y)(2 + \Delta_m)}$$

iDM: $\delta_y \ll 1$ niDM: $\delta_y \gtrsim 1$

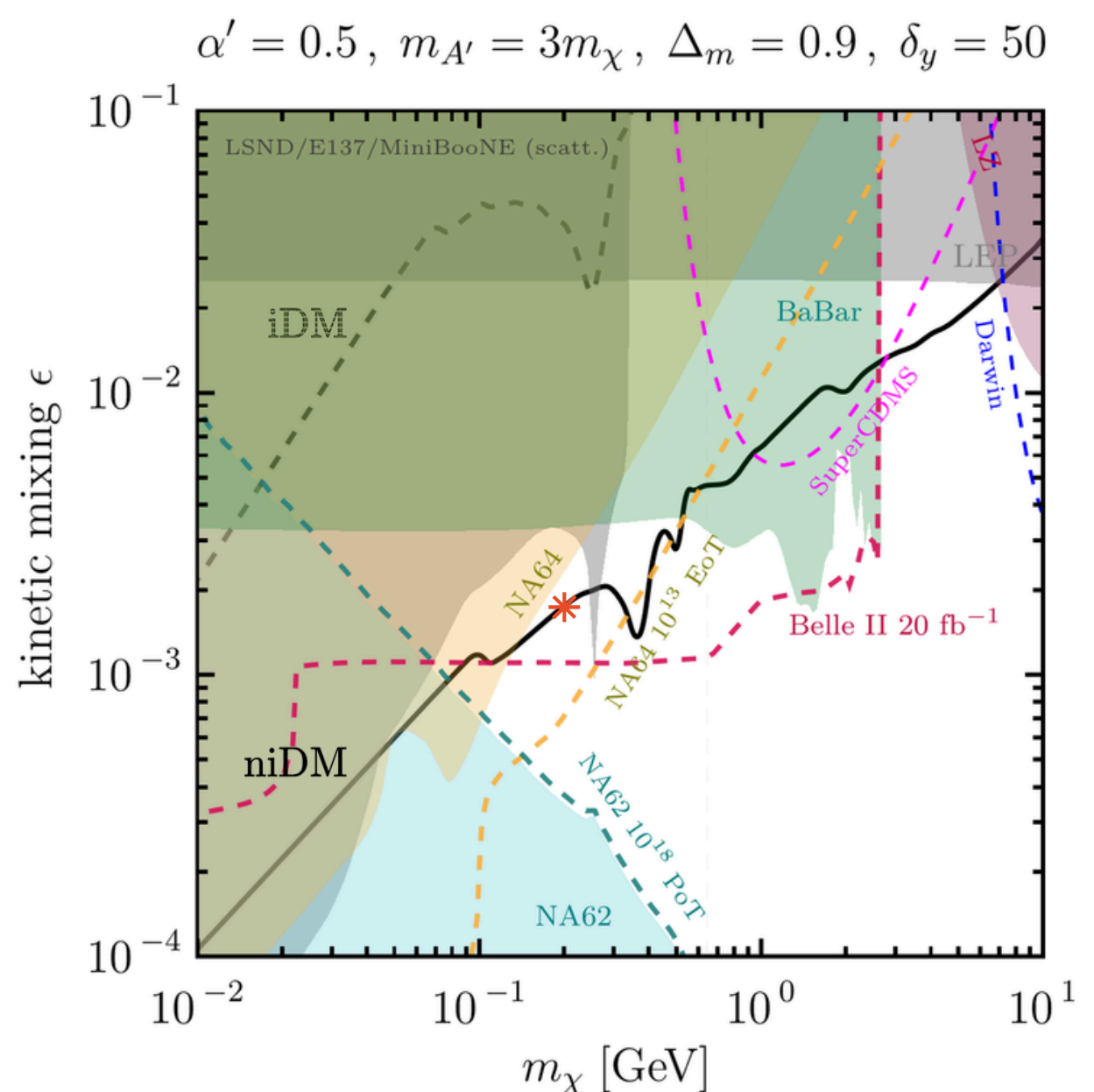
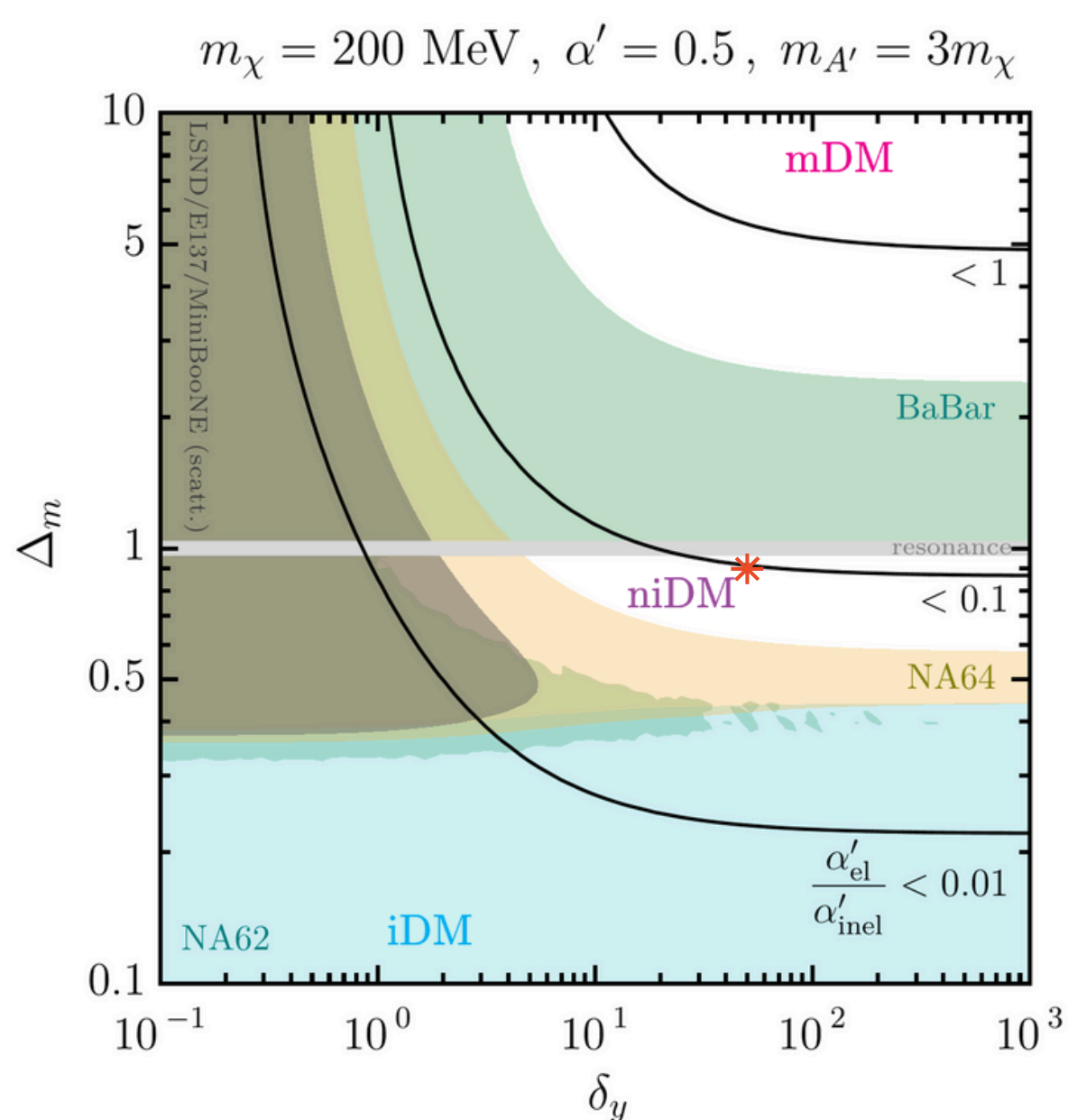


• Interactions with the Standard Model

$$\mathcal{L} \supset -\frac{1}{2} \frac{\epsilon}{\cos \theta_w} B^{\mu\nu} A'_{\mu\nu} \implies \gamma \text{ wavy} \text{ } \epsilon \text{ wavy} \text{ } A' \text{ i.e. } Q' = -\epsilon Q_{\text{em}}$$

$\theta_{H'H} \lesssim \epsilon$

RESULTS



OUTLOOK

new ideas at future colliders & direct detection experiments for $m_\chi \sim 5$ GeV
new signatures: displaced vertices, double bang...
other experiments: NA64-muon, DUNE...