

Will light dark matter show itself via the Migdal effect or Bremsstrahlung?



Nikhef

1 November
2019

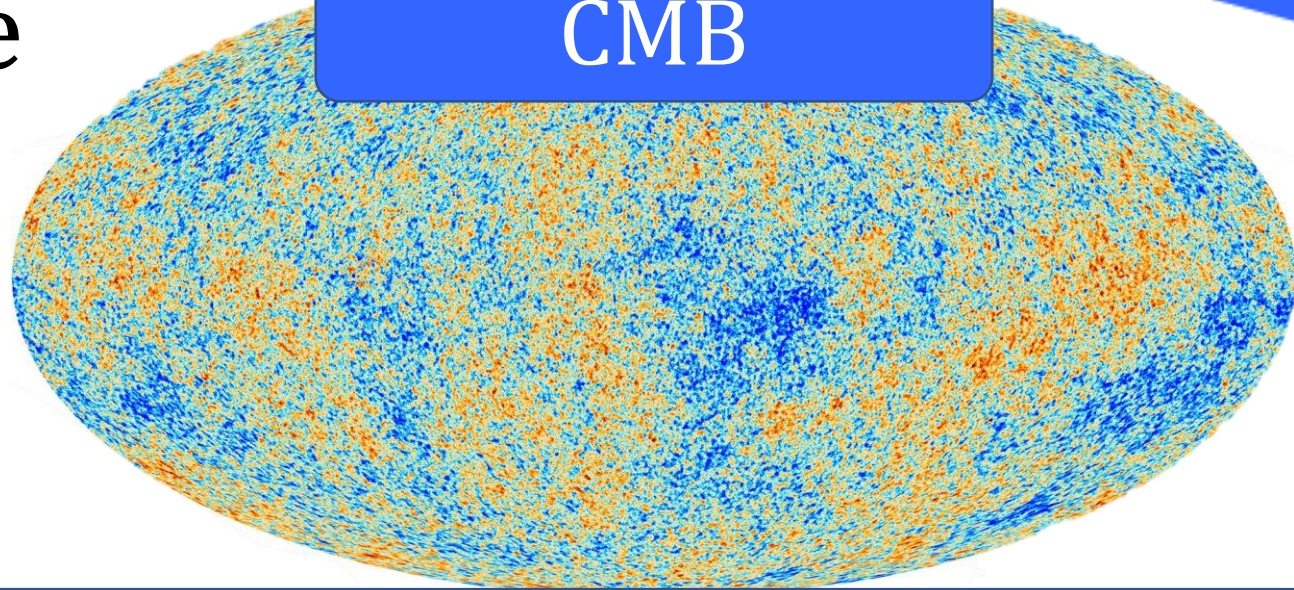
J. R. Angevaare
j.angevaare@nikhef.nl

[arXiv:1907.12771](https://arxiv.org/abs/1907.12771)

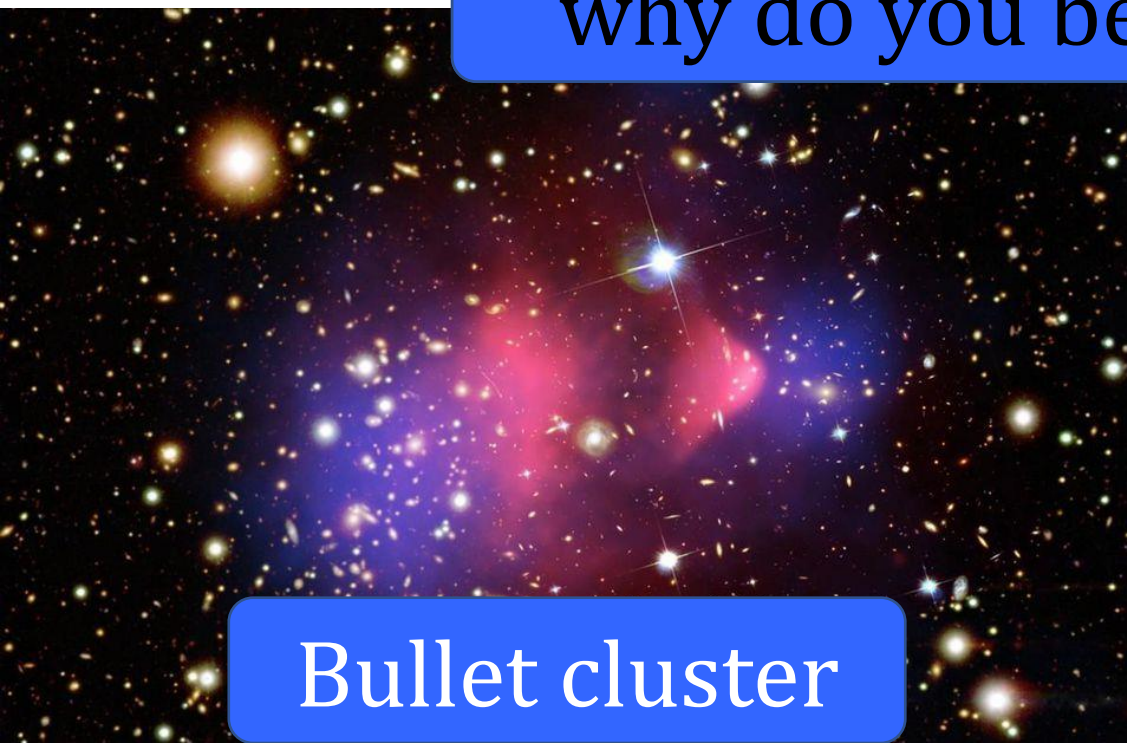
Evidence
DM

CMB

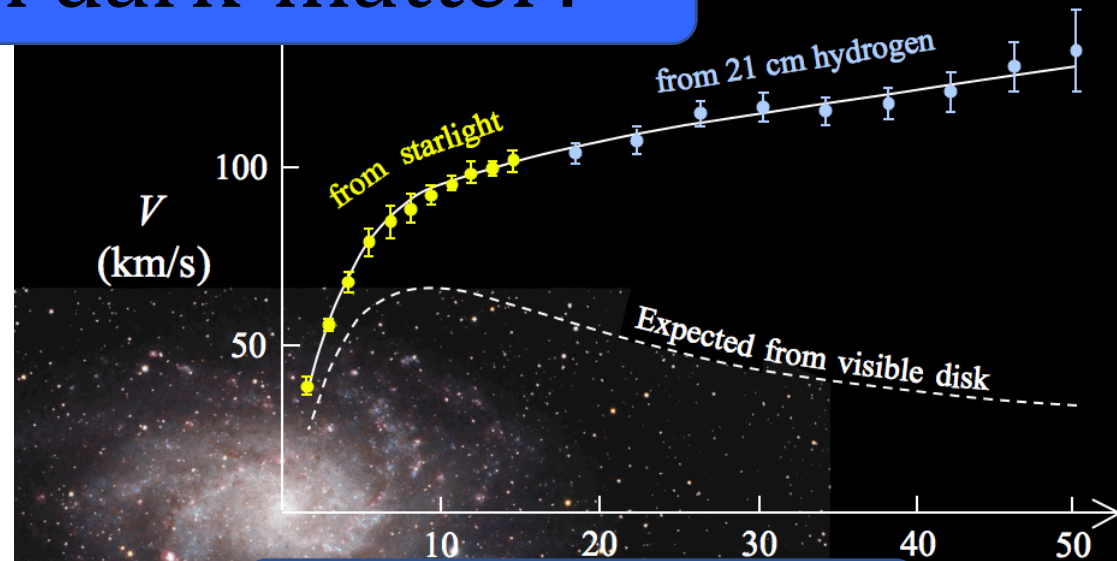
Joran Angevaere



why do you believe in dark-matter?



Bullet cluster



Rotation curve

The XENON Collaboration



Columbia



RPI

Nikhef



Muenster



Stockholm



Mainz



MPIK



Freiburg



Zurich



Chicago



UCLA



UCSD



Rice



Purdue



Coimbra



Subatech



LPNHE



LAL



Bologna



LNGS Torino Napoli



Weizmann



Tokyo



NAGOYA UNIVERSITY
Nagoya

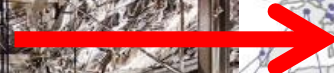
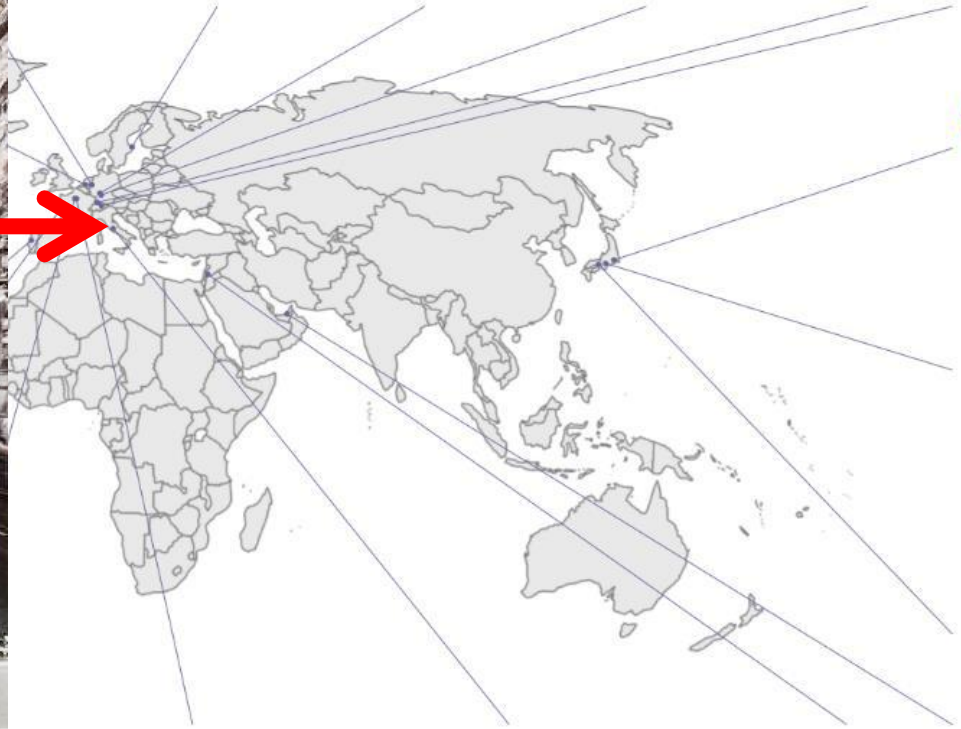


Kobe



3

NYUAD



Detecting DM

Wimp

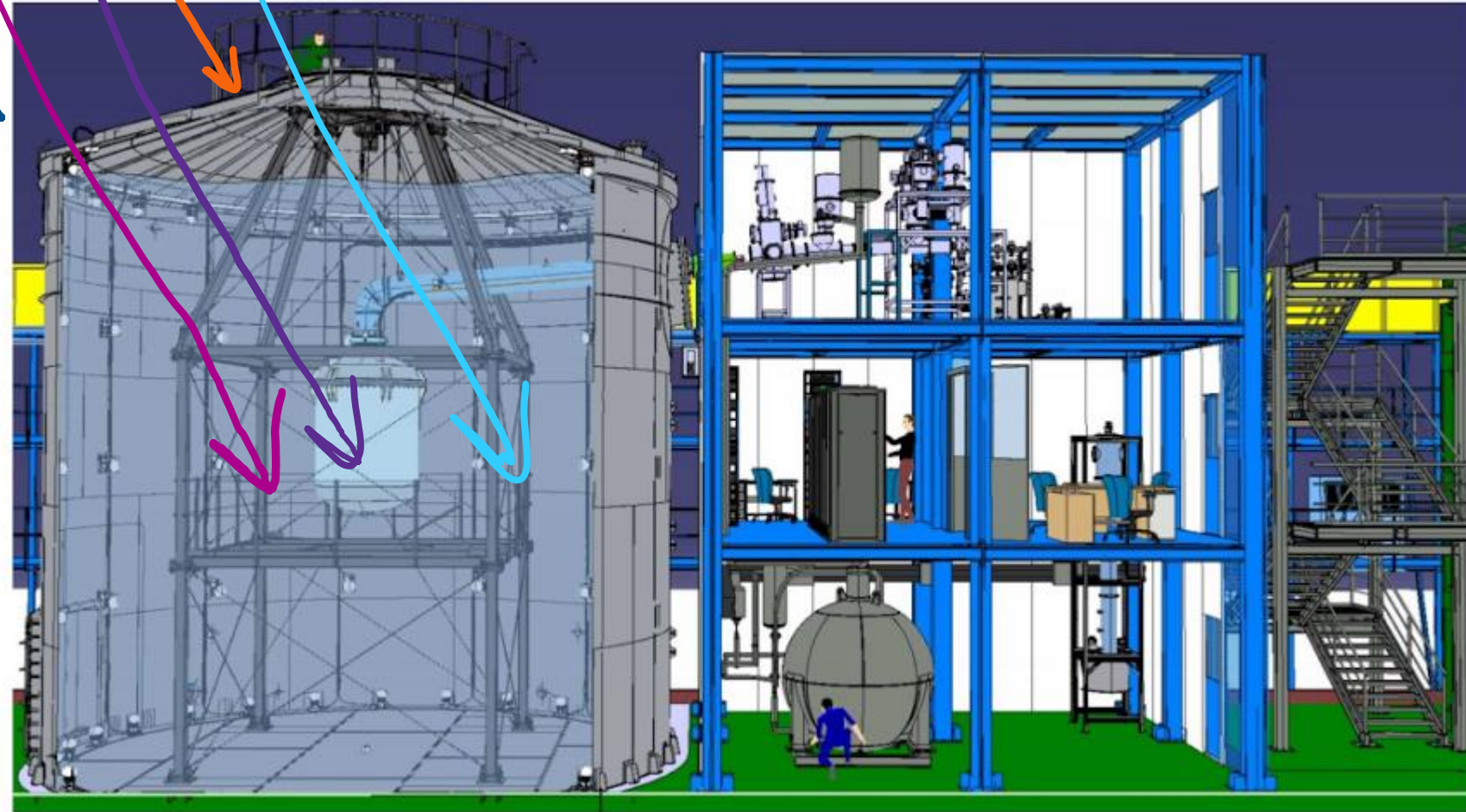


Detecting DM

WIMP
 β
 μ
CRs
 γ
 ν



Detecting DM



WIMP

CRs

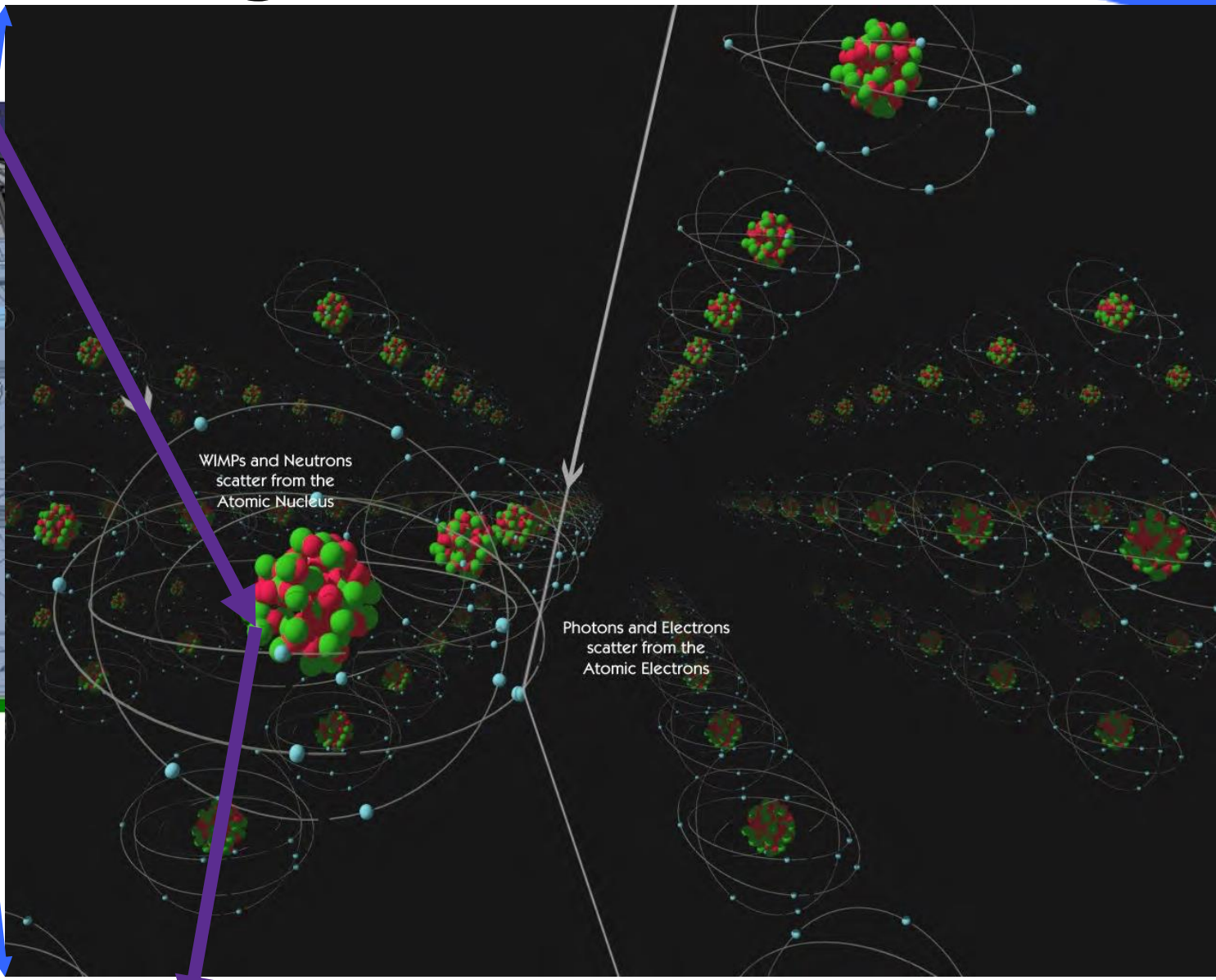
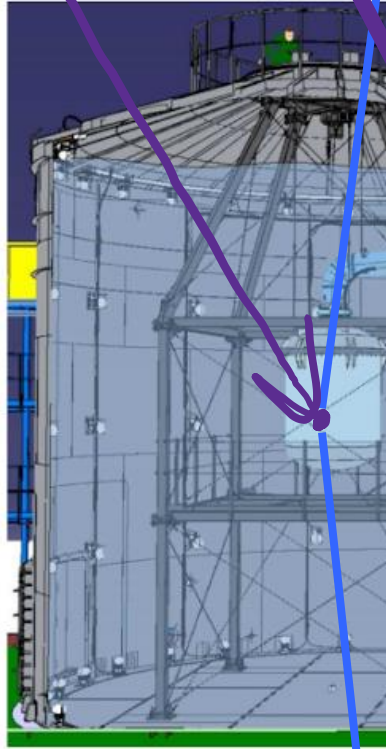
β

γ

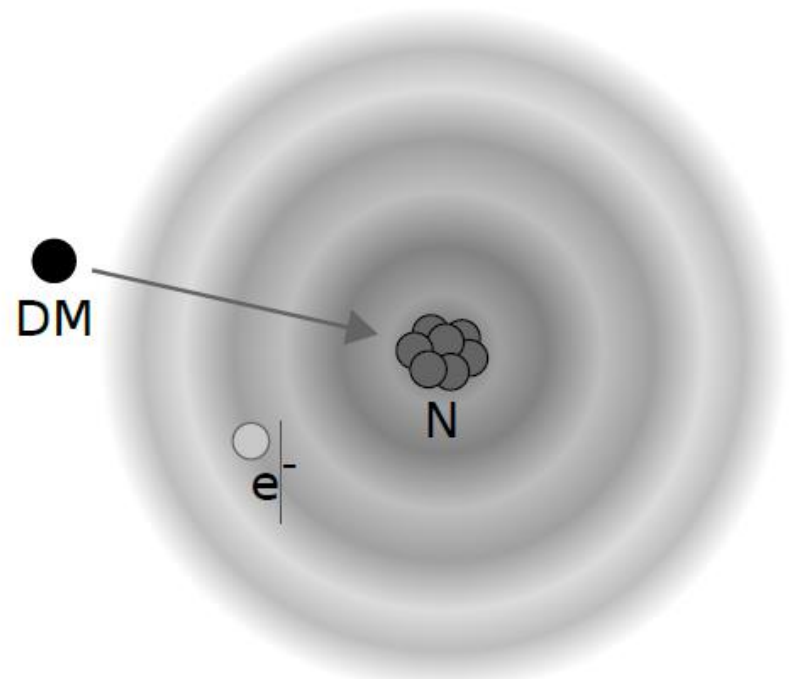
μ

ν

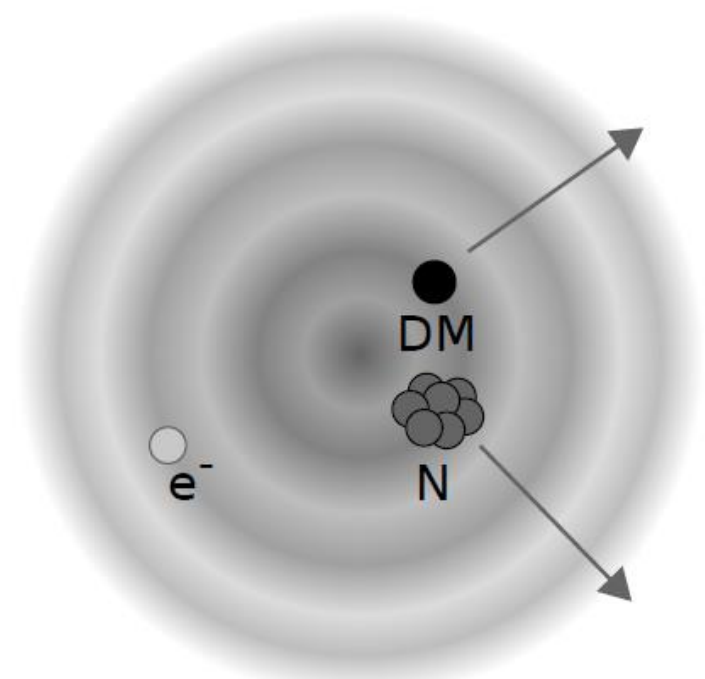
Detecting DM



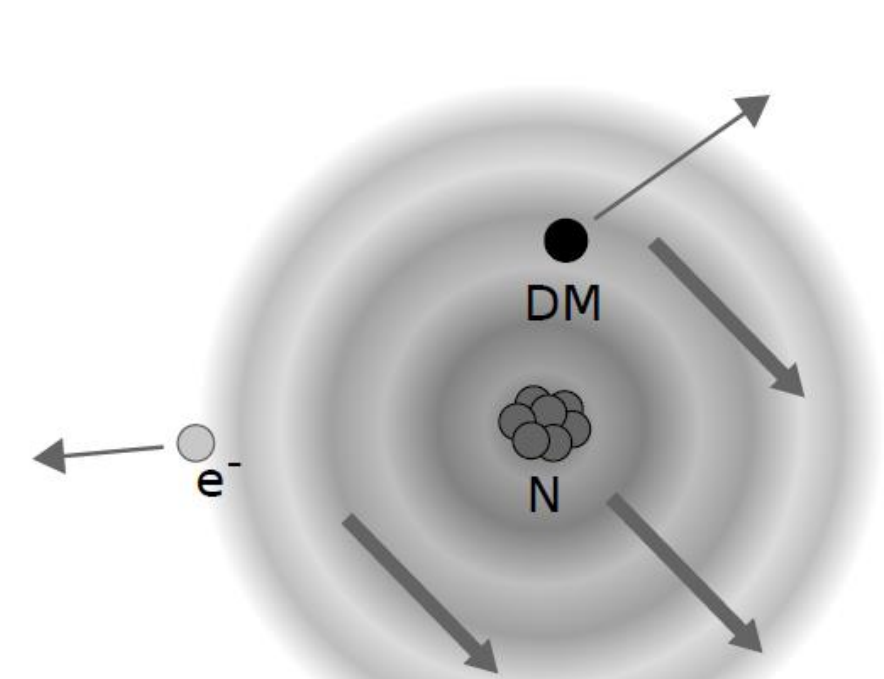
Migdal effect



DM scatters off nucleus

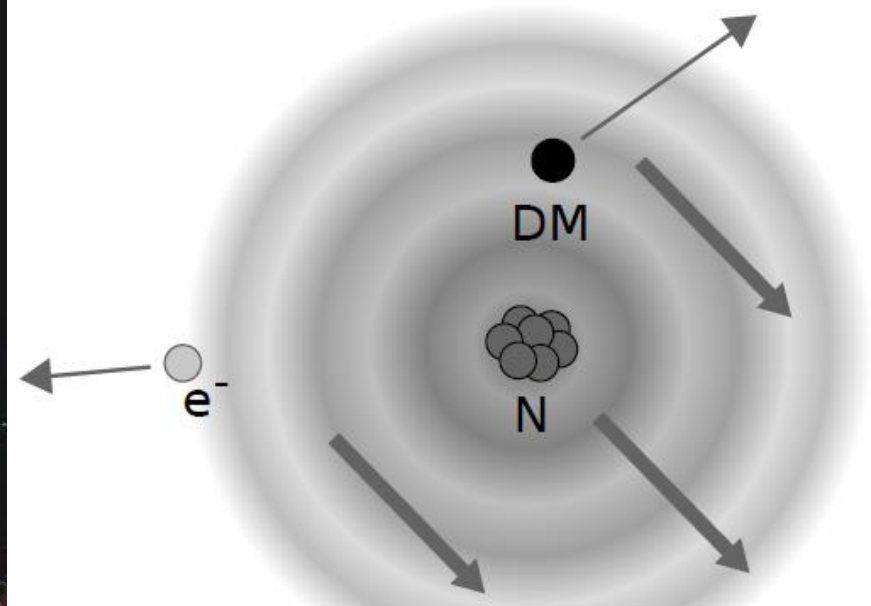
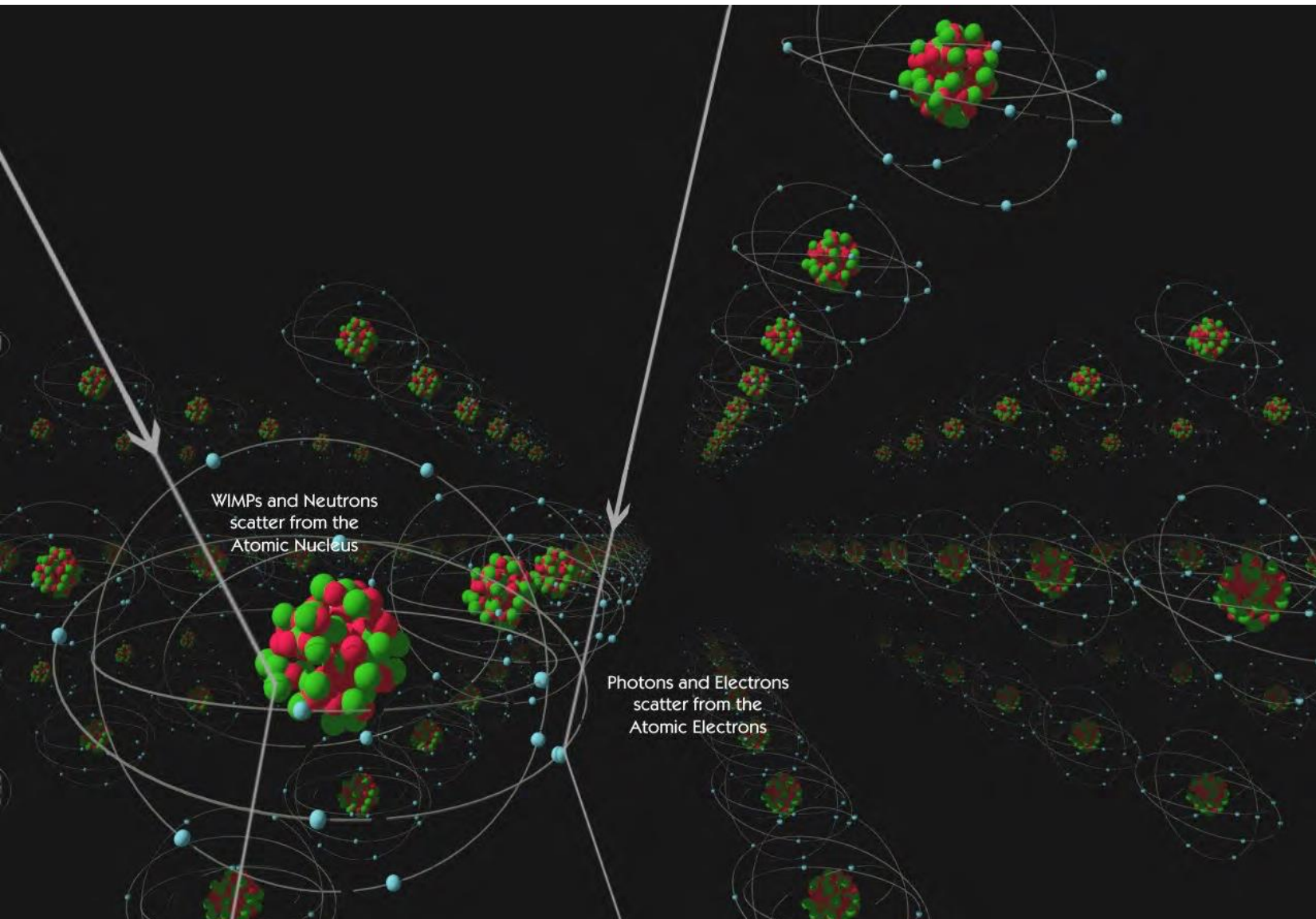


Nucleus displaced, electron cloud will follow



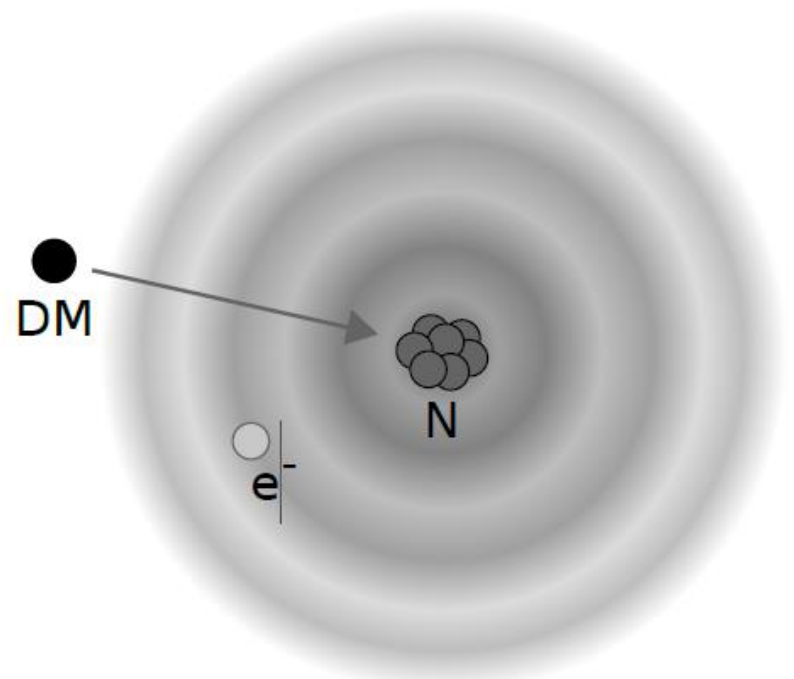
Electron cloud 'catches up' leading to ionized electron

Migdal

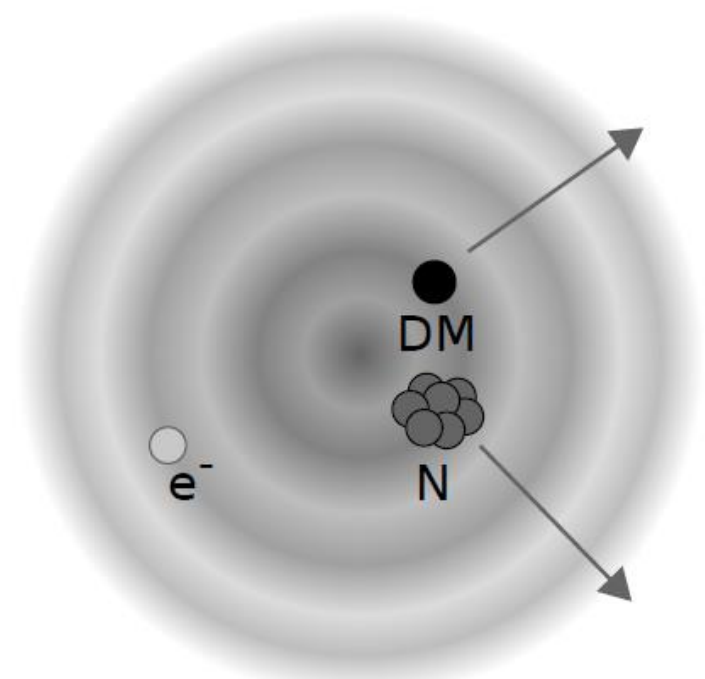


Electron cloud 'catches up' leading to ionized electron

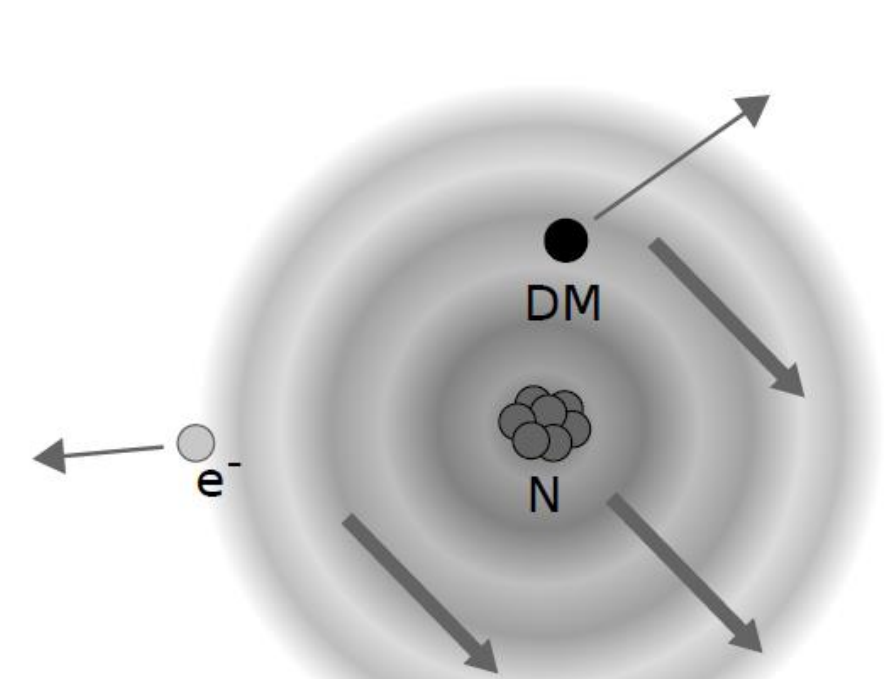
Migdal



DM scatters of nucleus

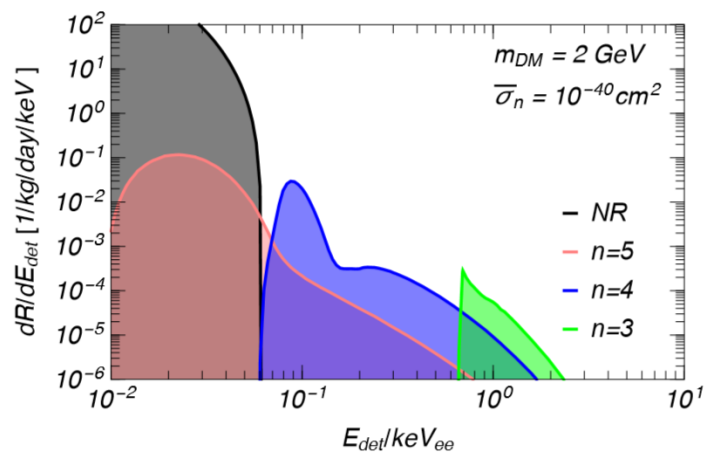
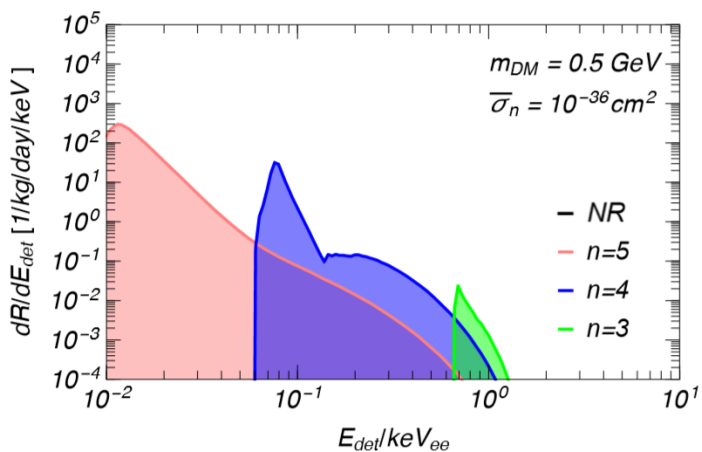


Nucleus displaced, electron cloud will follow



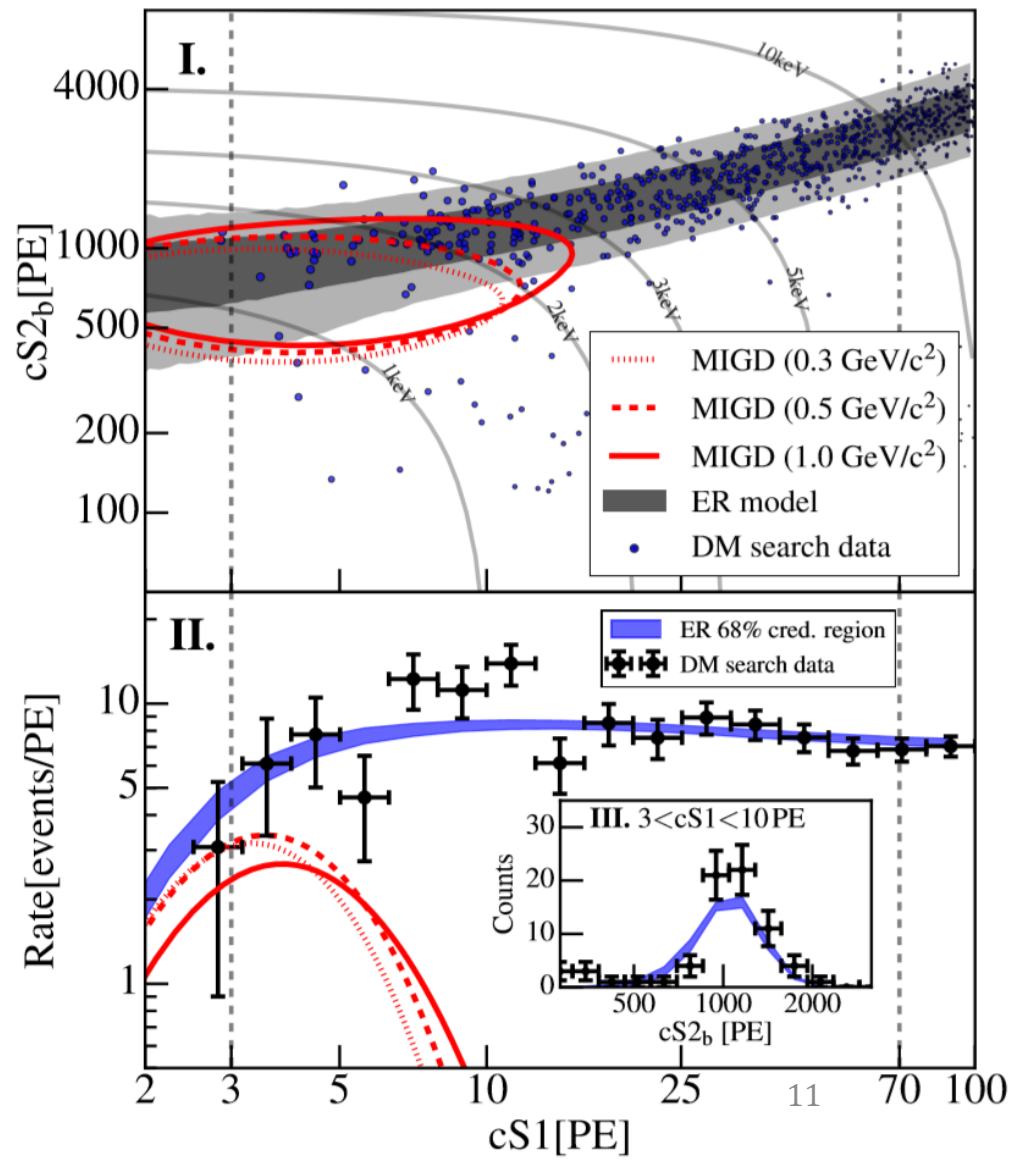
Electron cloud 'catches up' leading to ionized electron

Migdal search region



[arXiv:1707.07258](https://arxiv.org/abs/1707.07258)

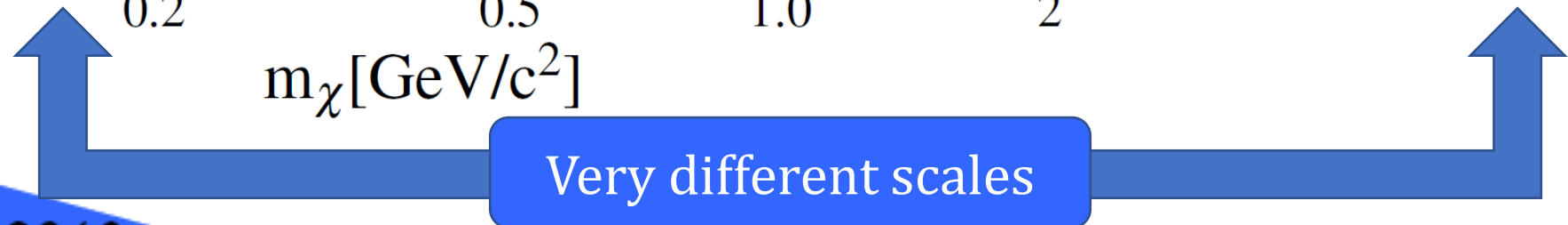
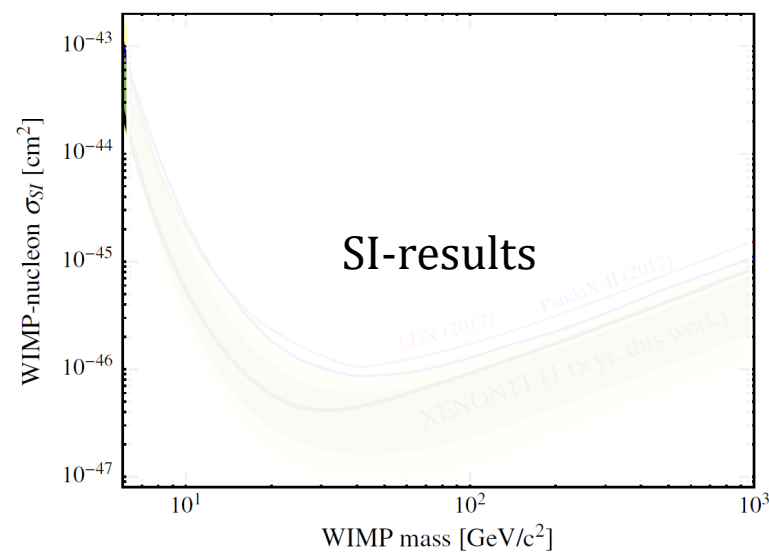
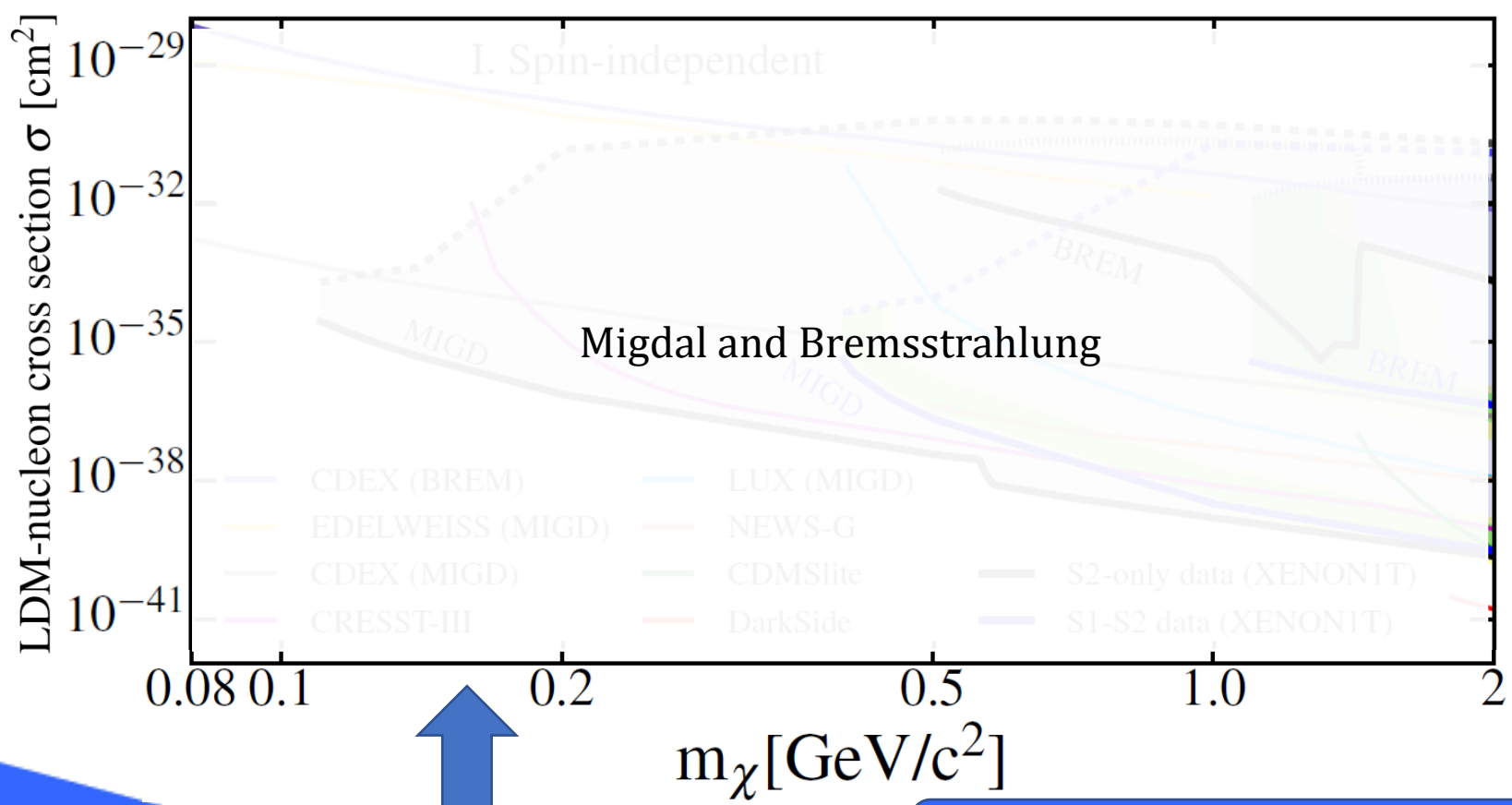
[arXiv:1907.12771](https://arxiv.org/abs/1907.12771)



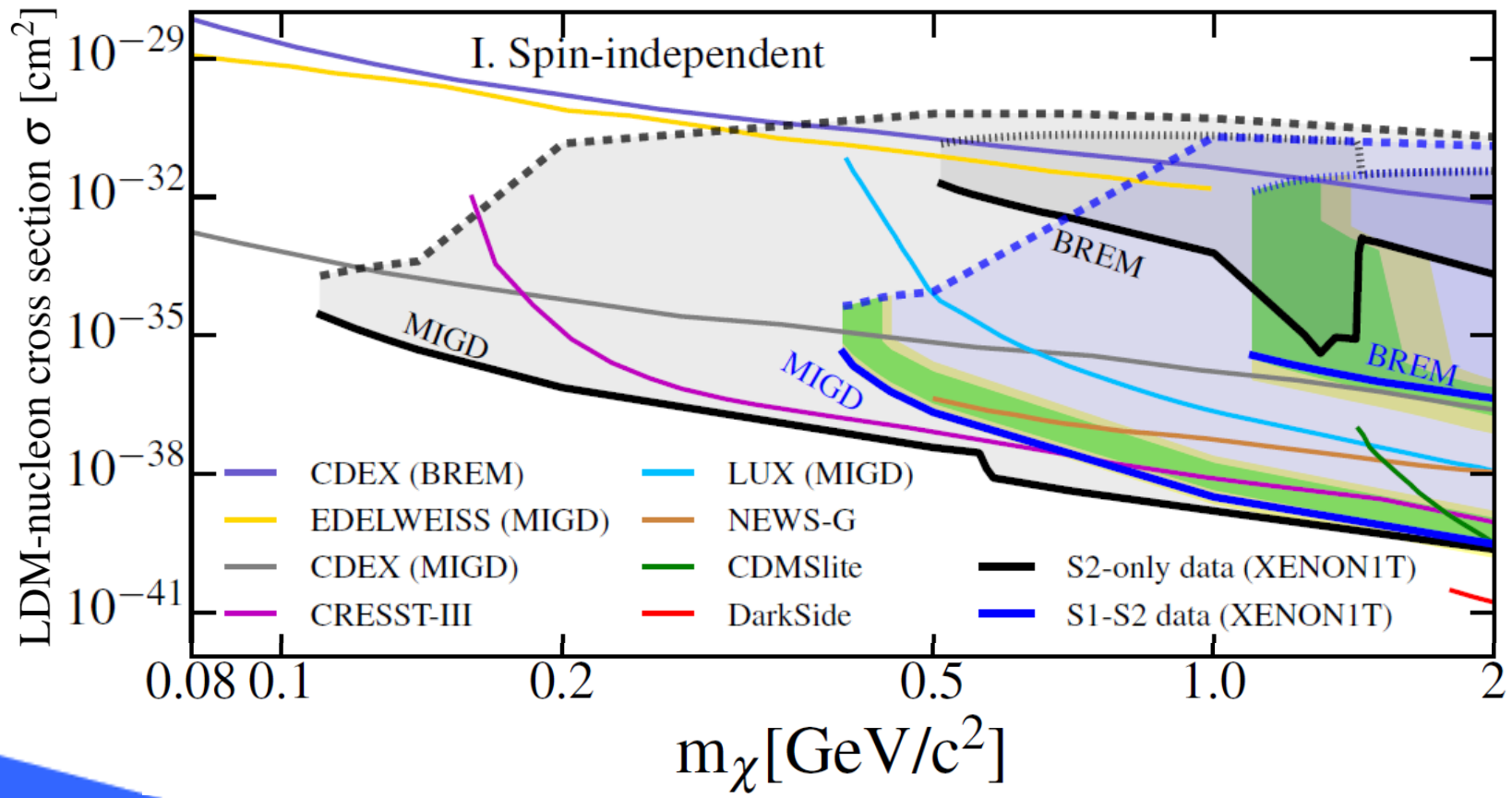
Results

[arXiv:1907.12771](https://arxiv.org/abs/1907.12771)

[arXiv:1805.12562](https://arxiv.org/abs/1805.12562)

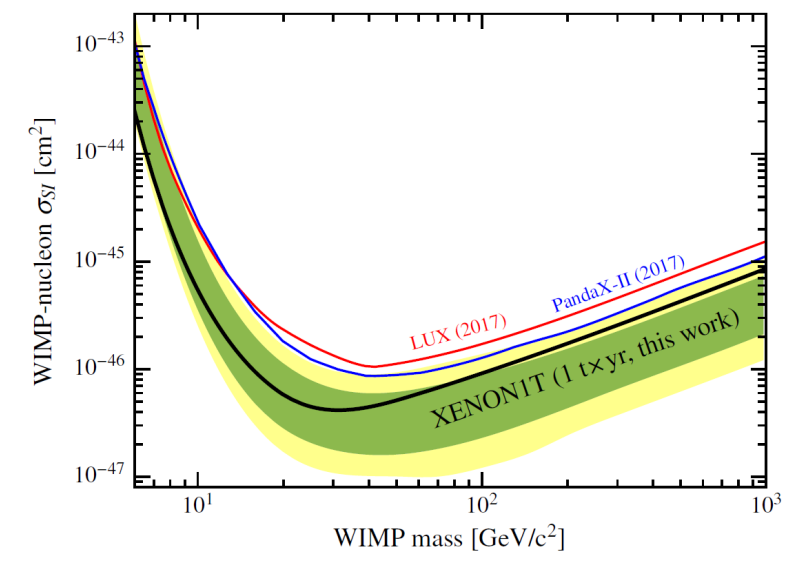


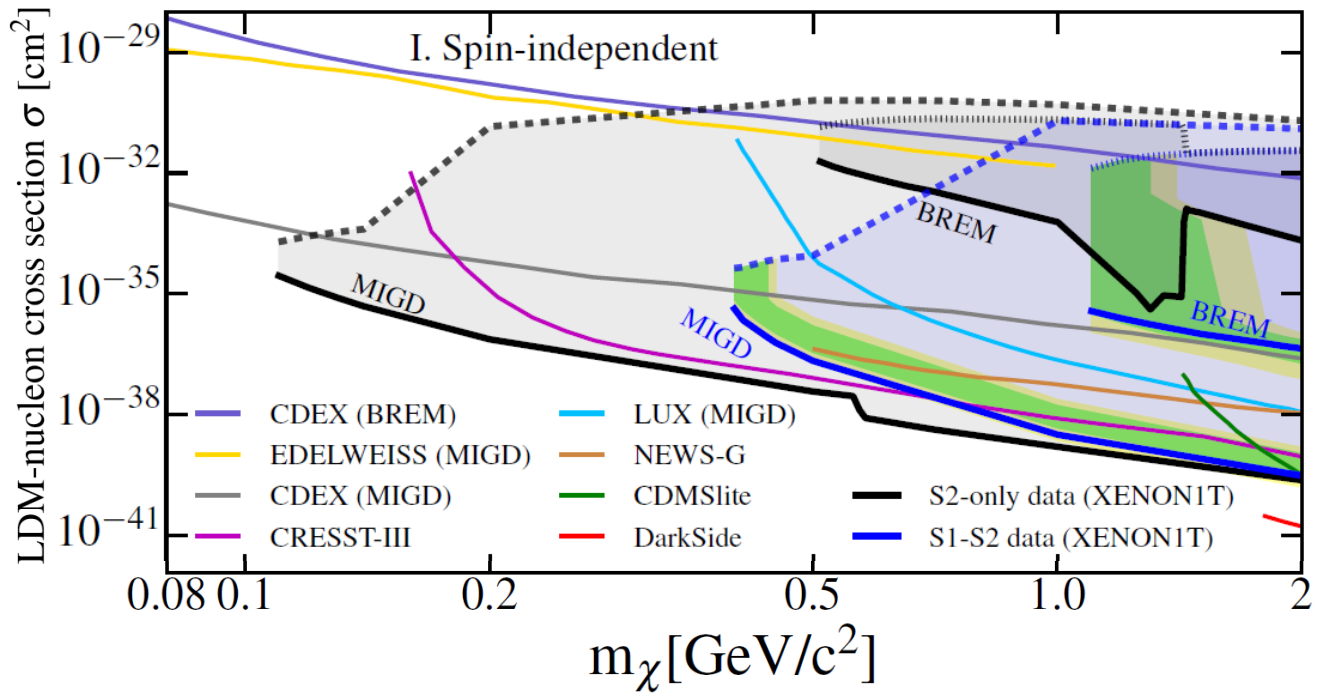
Results



[arXiv:1907.12771](https://arxiv.org/abs/1907.12771)

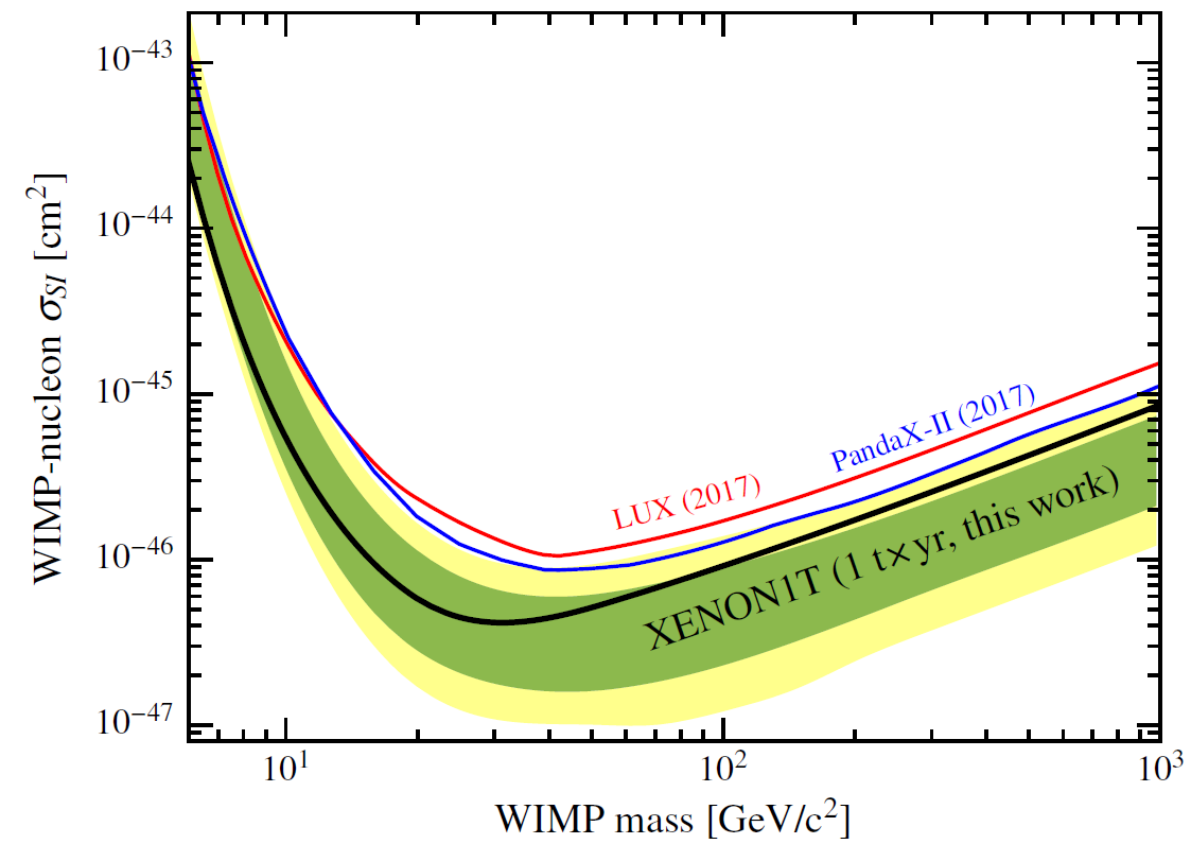
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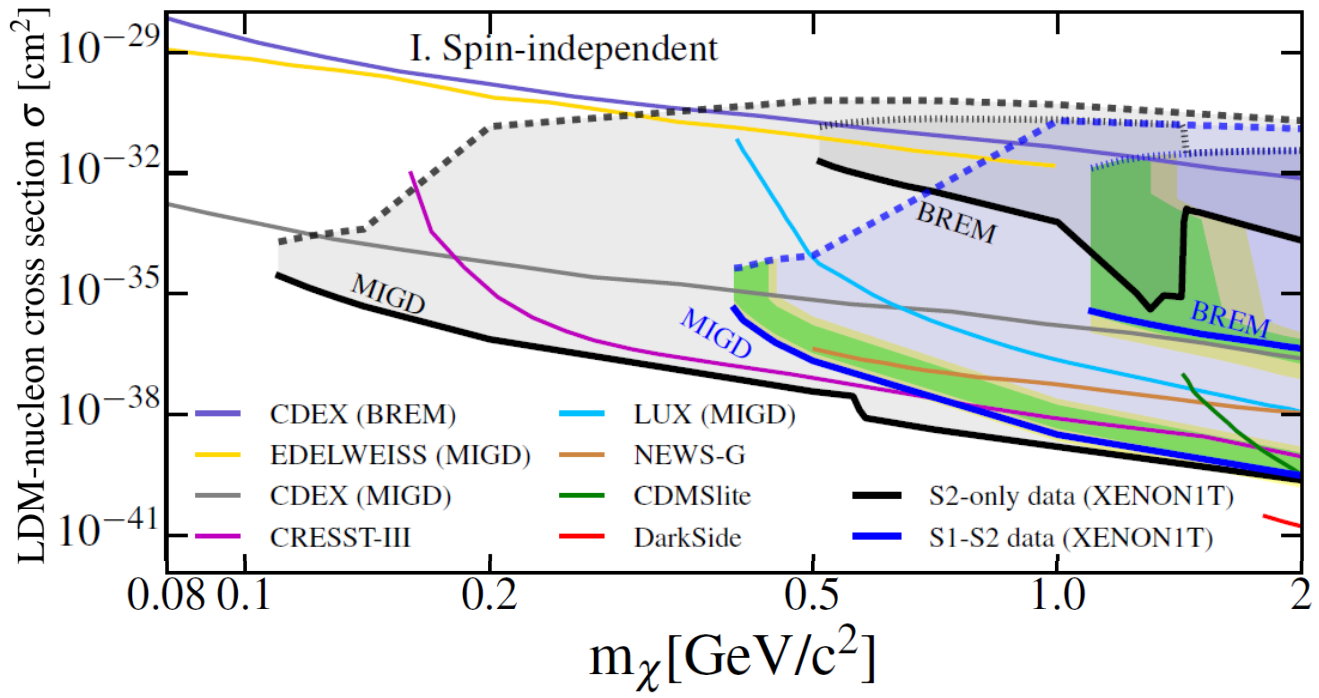




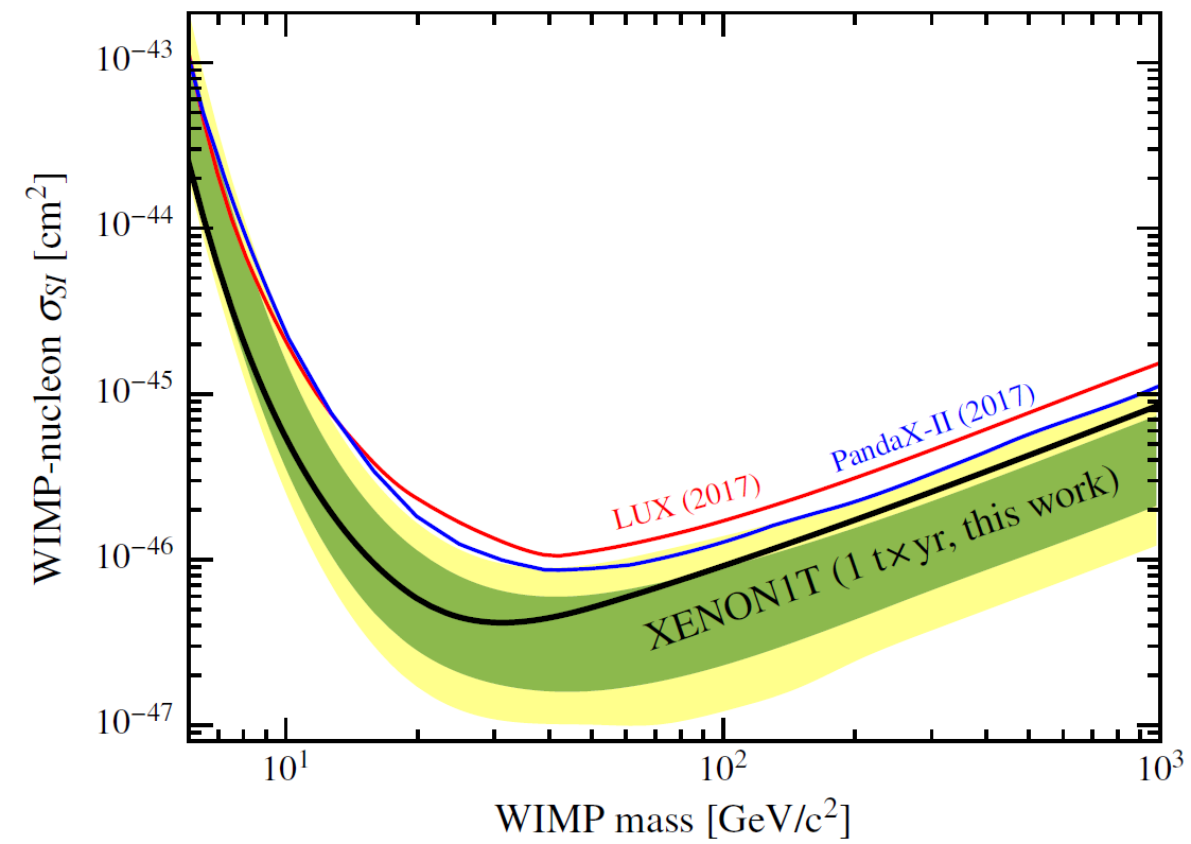
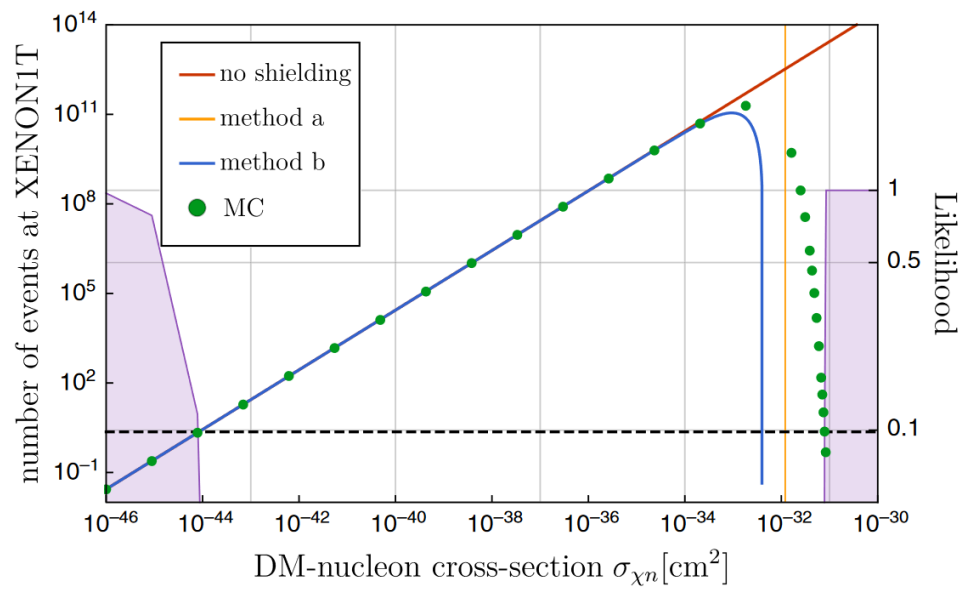
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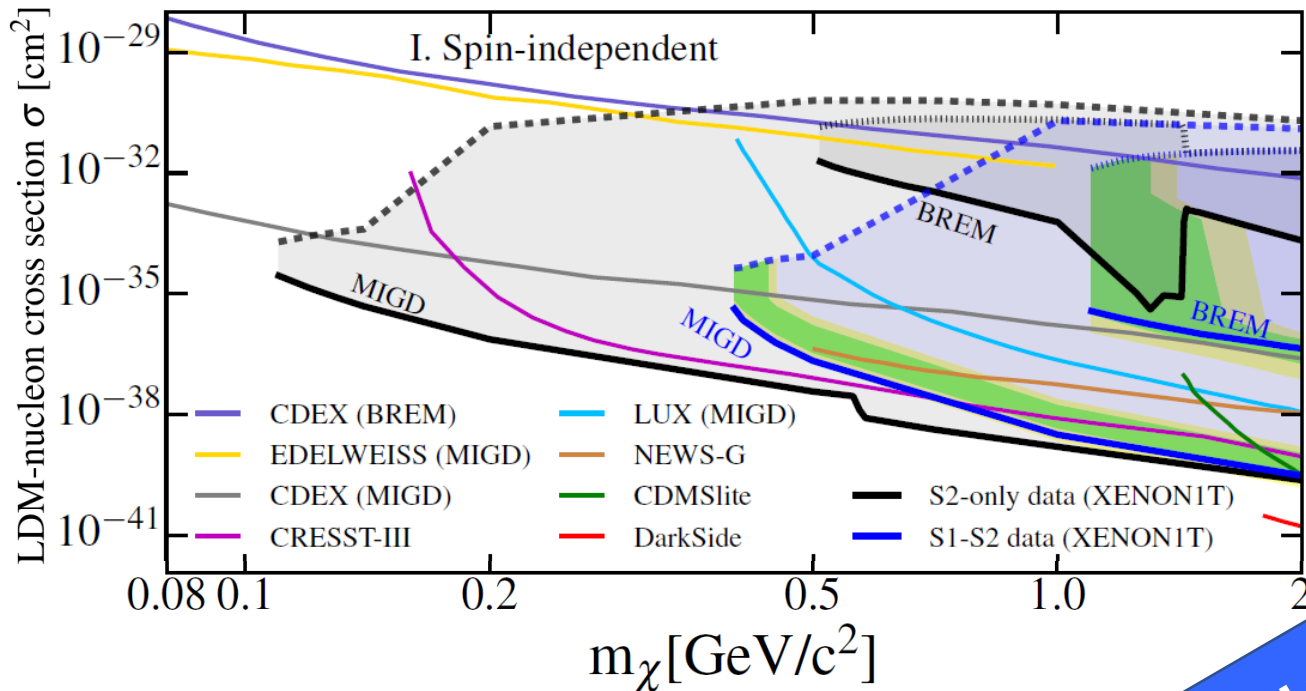
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[arXiv:1805.12562](https://arxiv.org/abs/1805.12562)
[Phys Rev D. 97.115047](https://arxiv.org/abs/1805.12562)





How will DM show itself in XENONnT?

[1907.12771](https://arxiv.org/abs/1907.12771)

[arXiv:1805.12562](https://arxiv.org/abs/1805.12562)

