

Indirect detection of sub-GeV dark matter

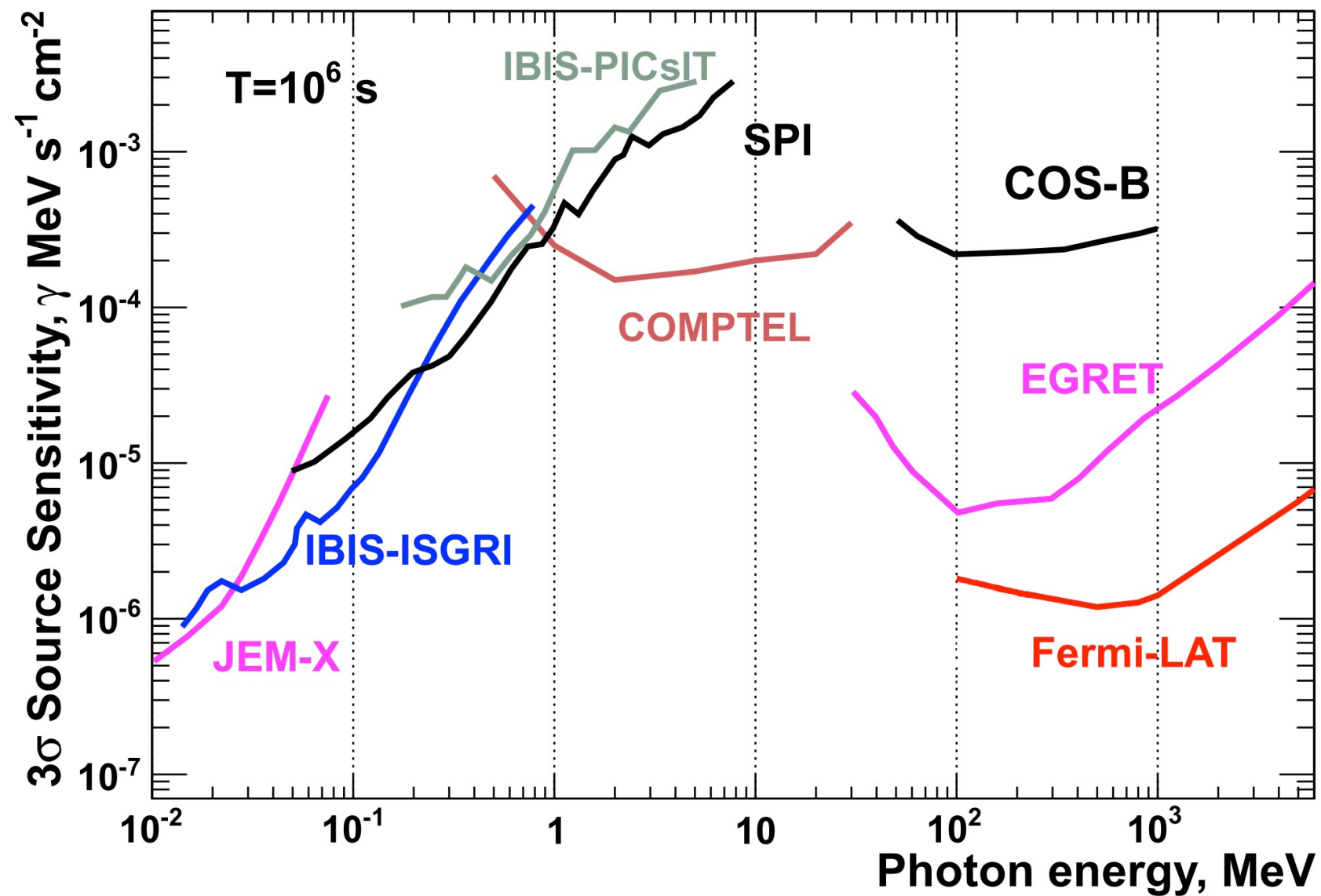


Adam Coogan
UC Santa Cruz

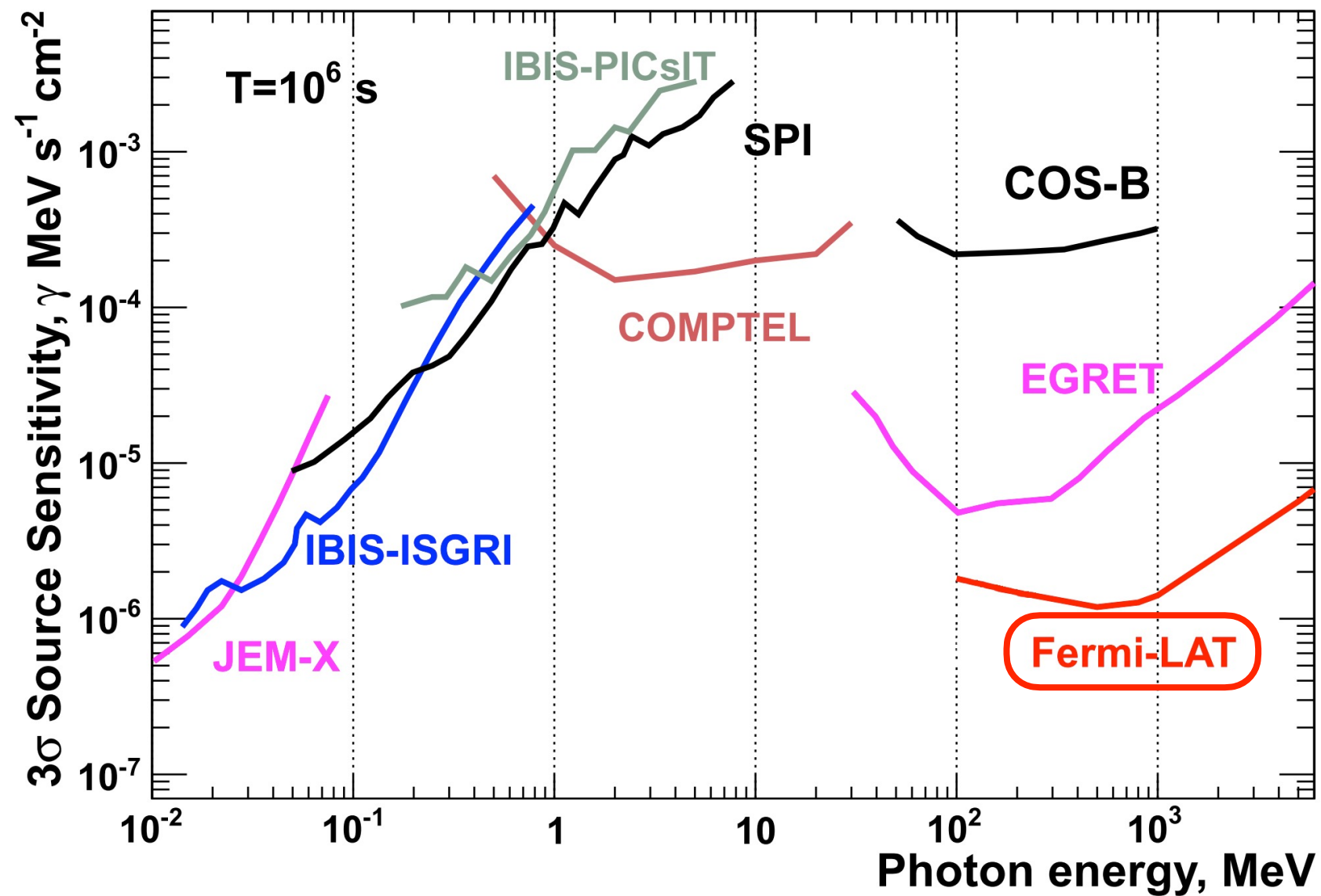


In progress with F. D'Eramo,
L. Morrison and S. Profumo

MeV gamma rays

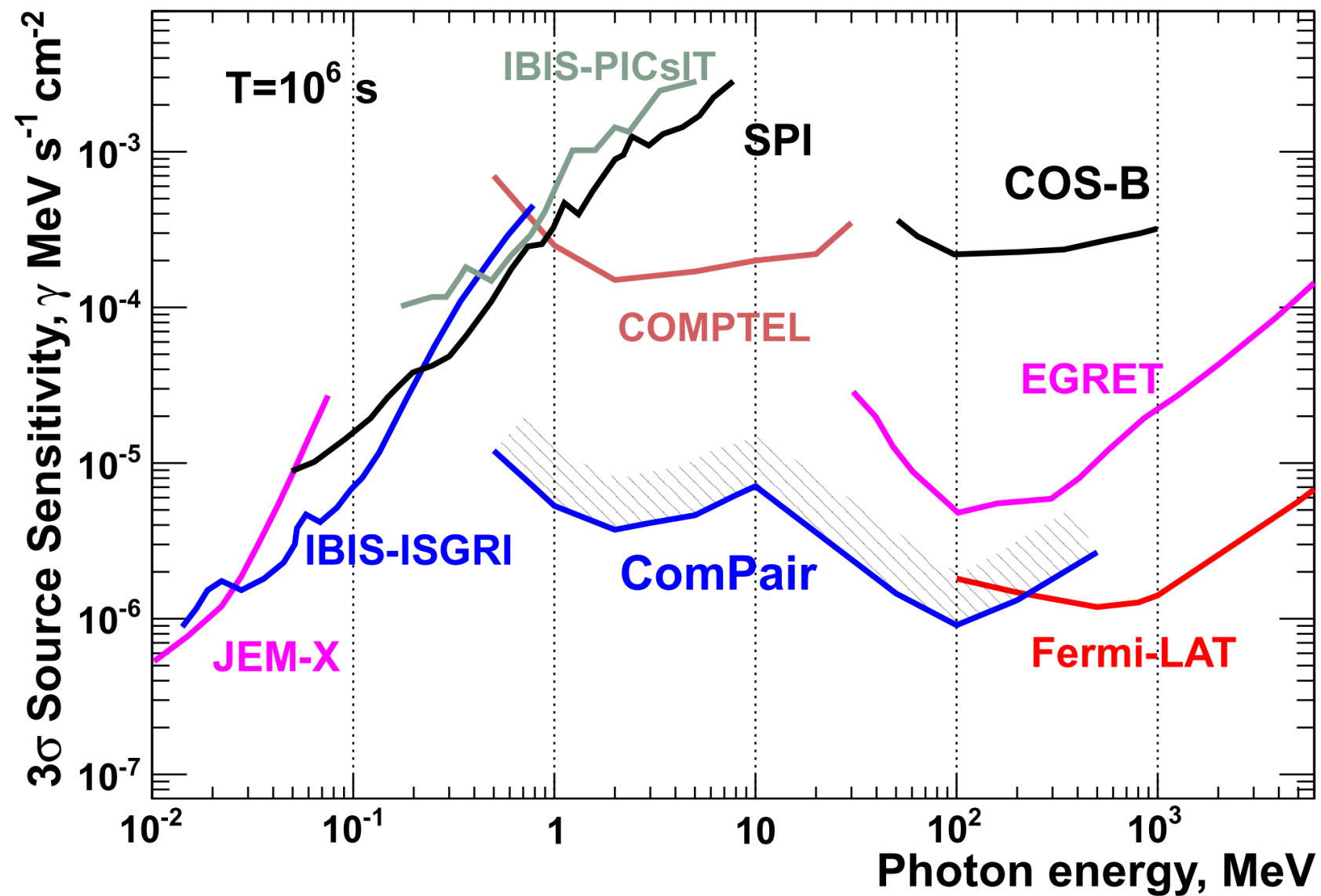


MeV gamma rays

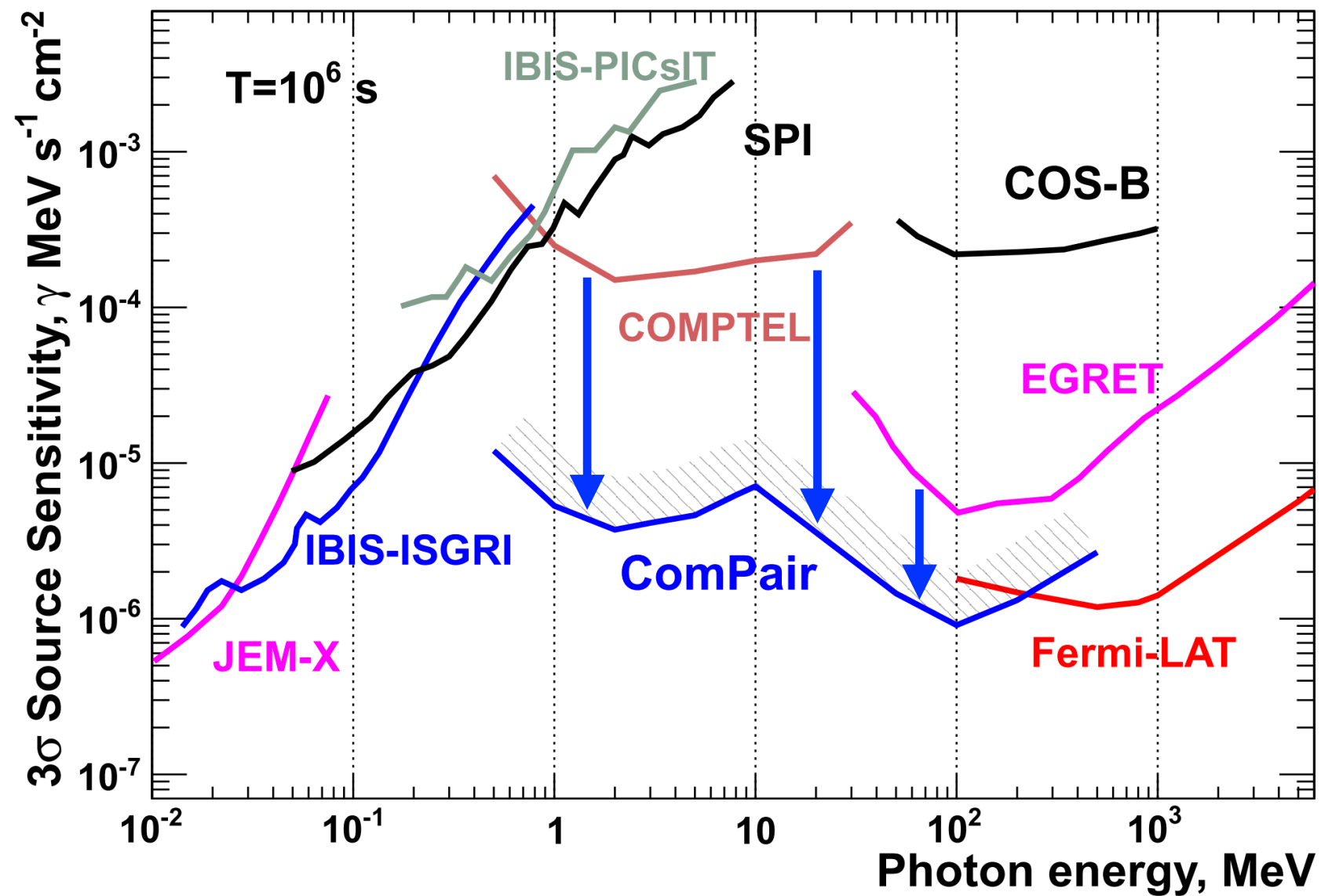


Thorough probe
of WIMP DM

MeV gamma rays

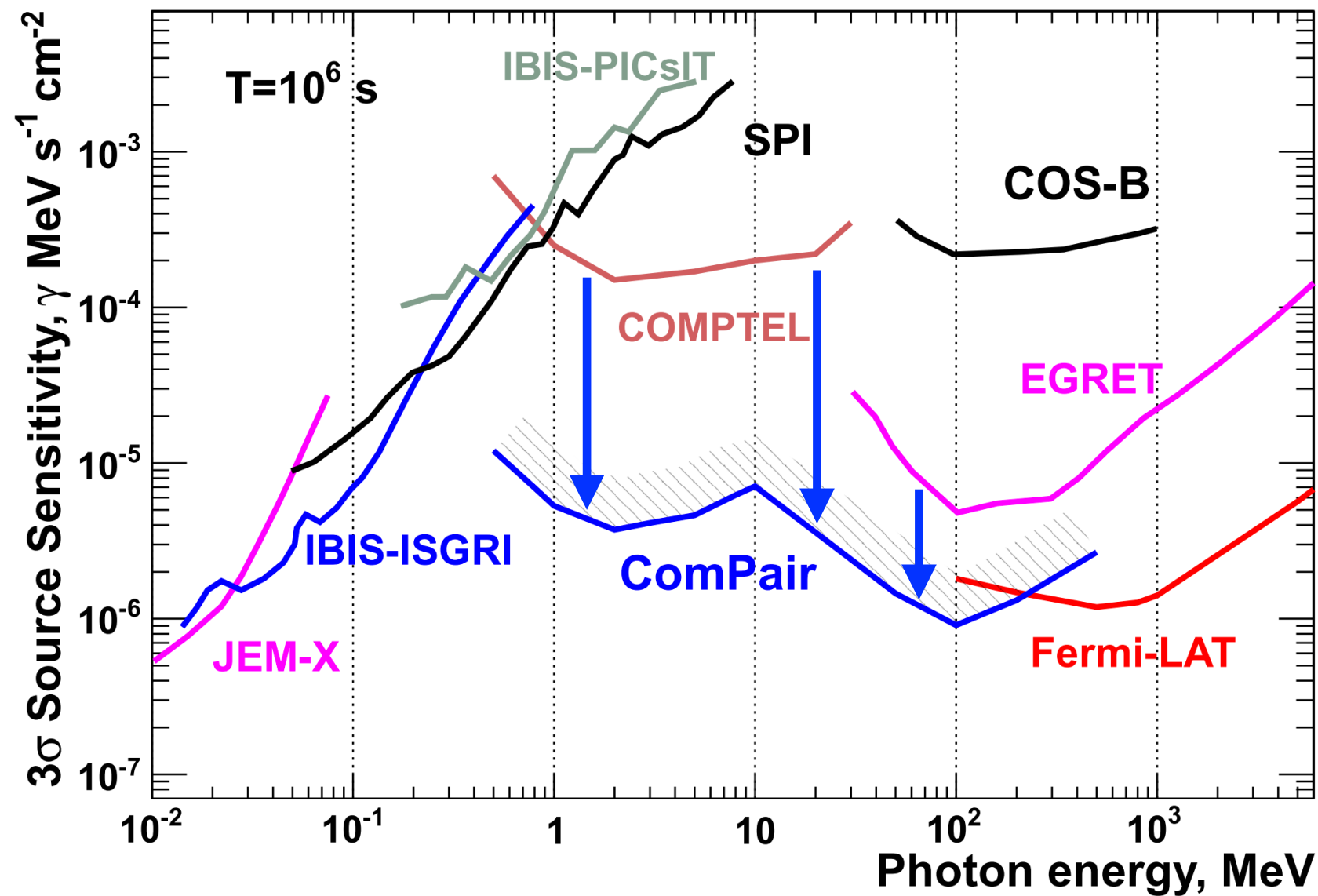


MeV gamma rays



100× sensitivity
increase

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Opportunity to explore
sub-GeV dark matter!

Project overview

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Universal
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Kinetic
mixing

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- Dark matter, χ : Dirac fermion, SM singlet

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 - Scalar-like: as with mass terms, treat as spurions

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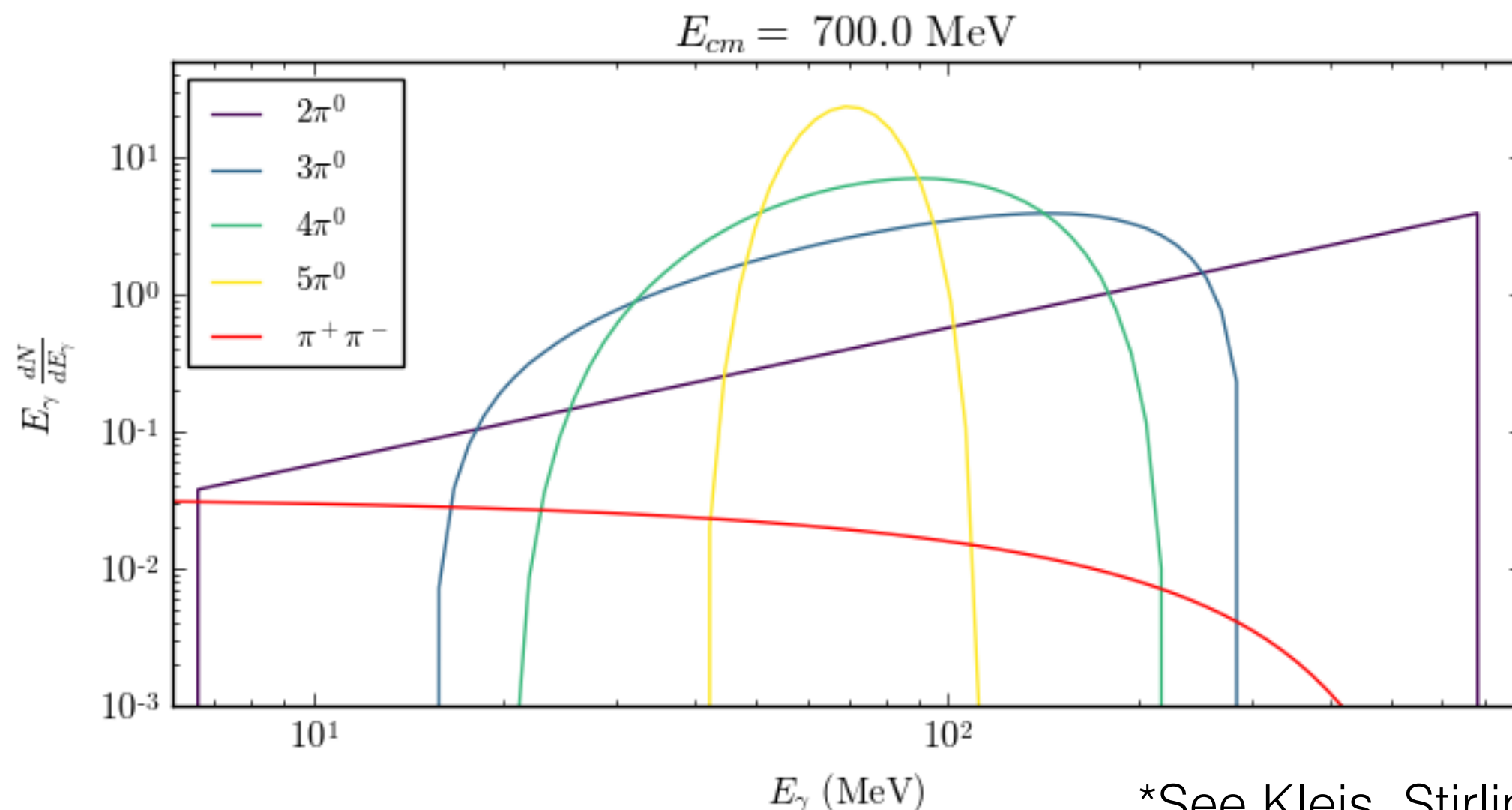
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 - Generate n -body phase space using RAMBO*:



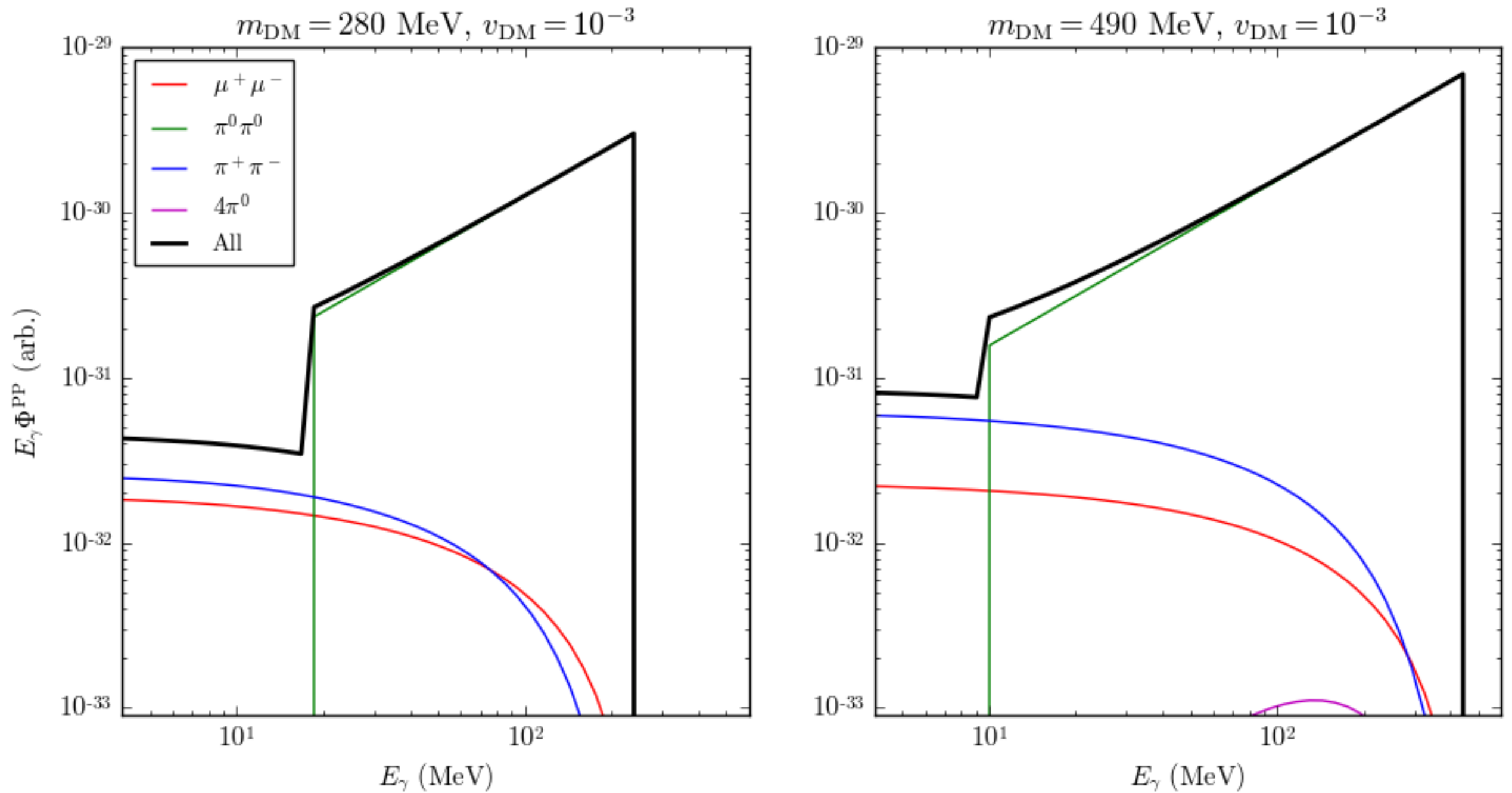
*See Kleis, Stirling, Ellis 1986

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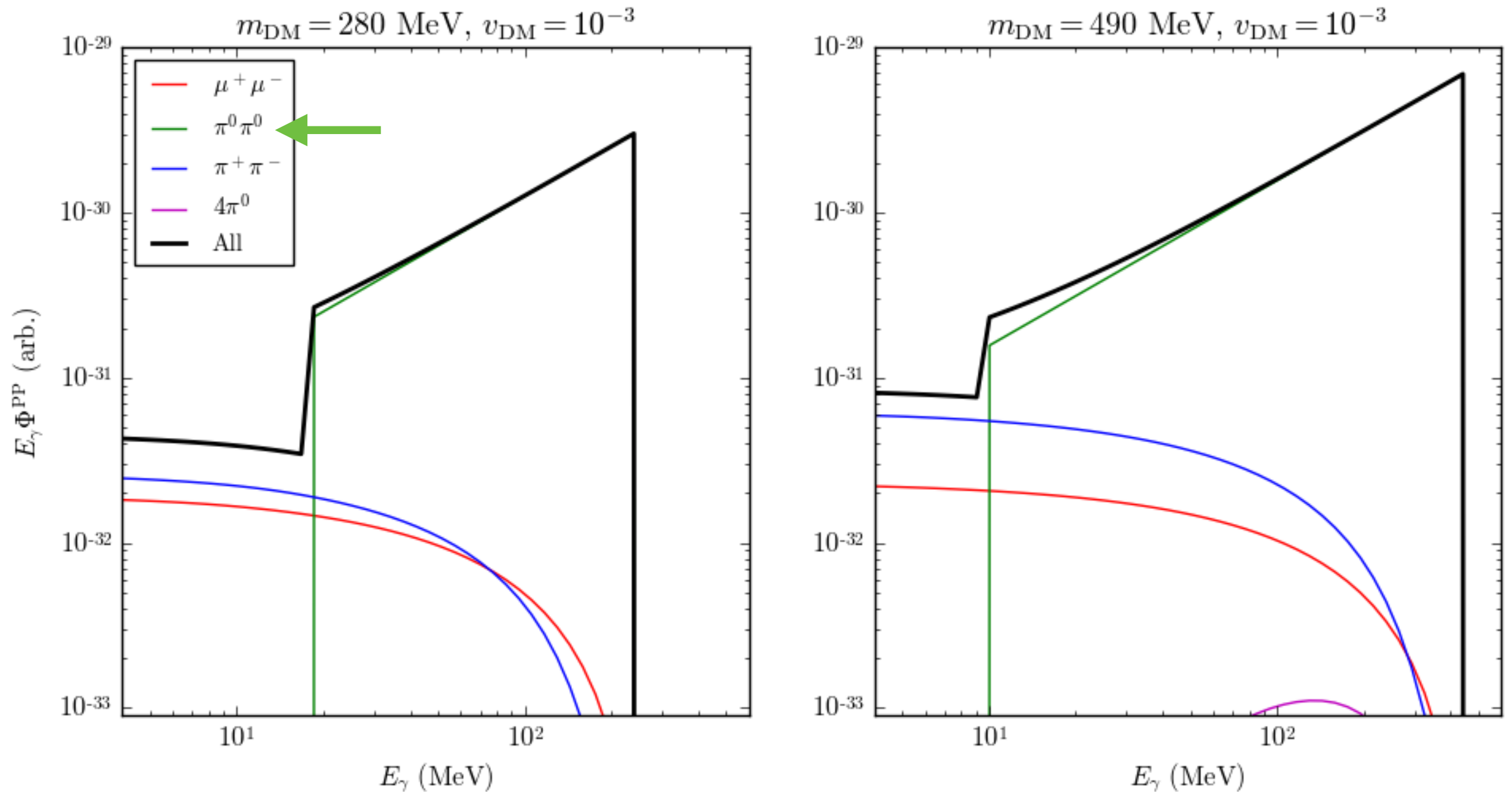
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Φ^{PP} results

Higgs portal mediator

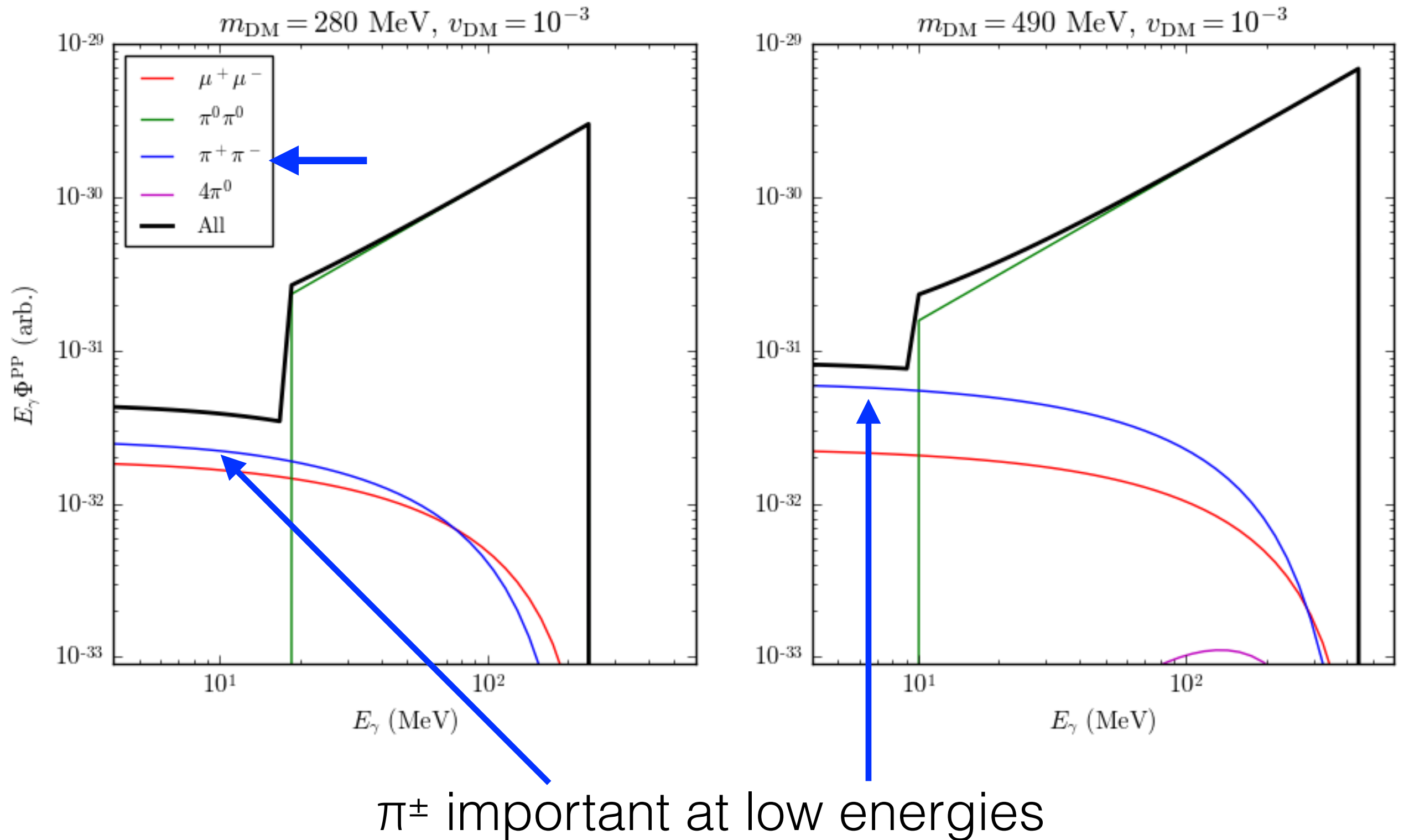


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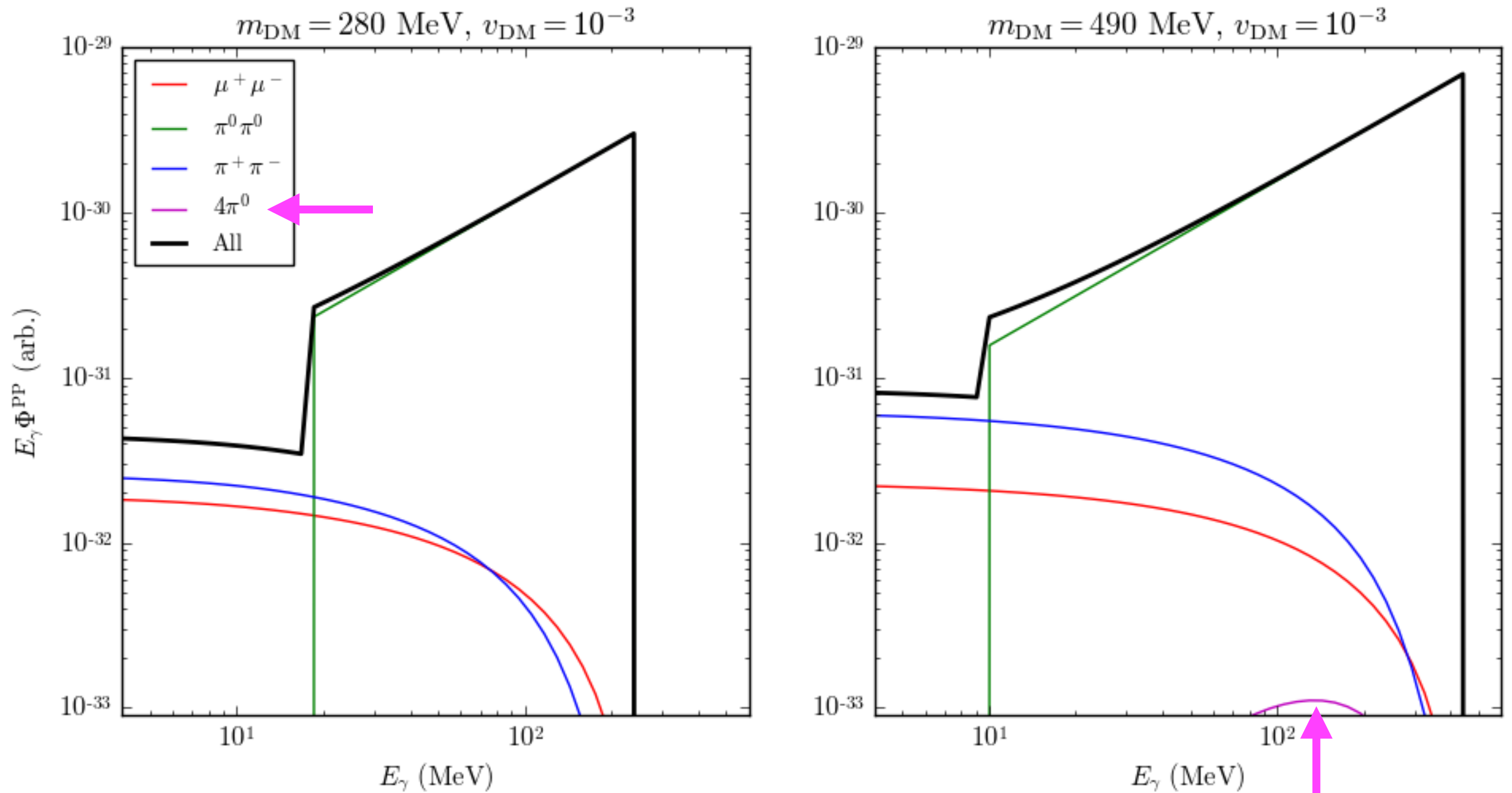


π^0 contribution dominates

Higgs portal mediator

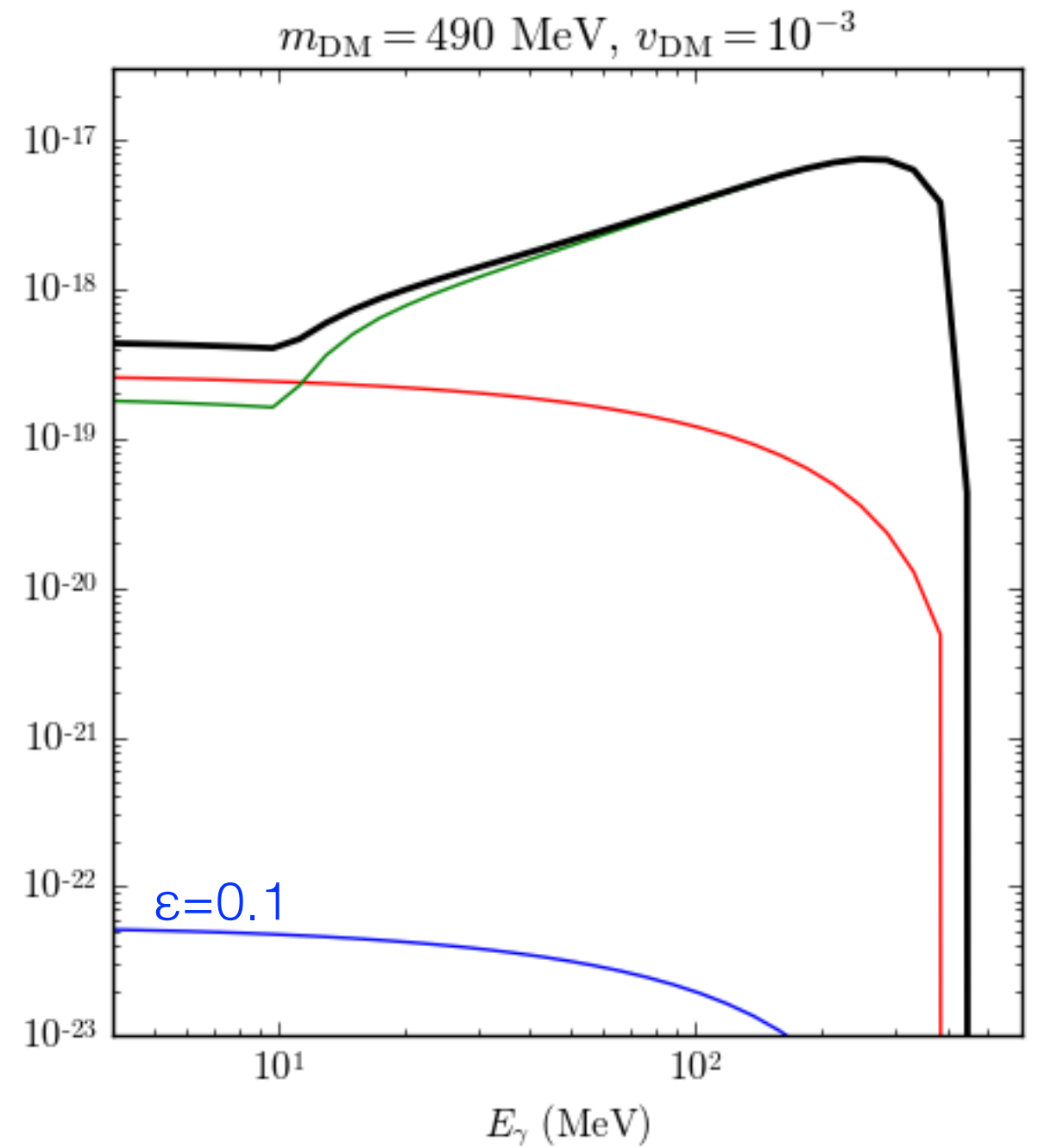
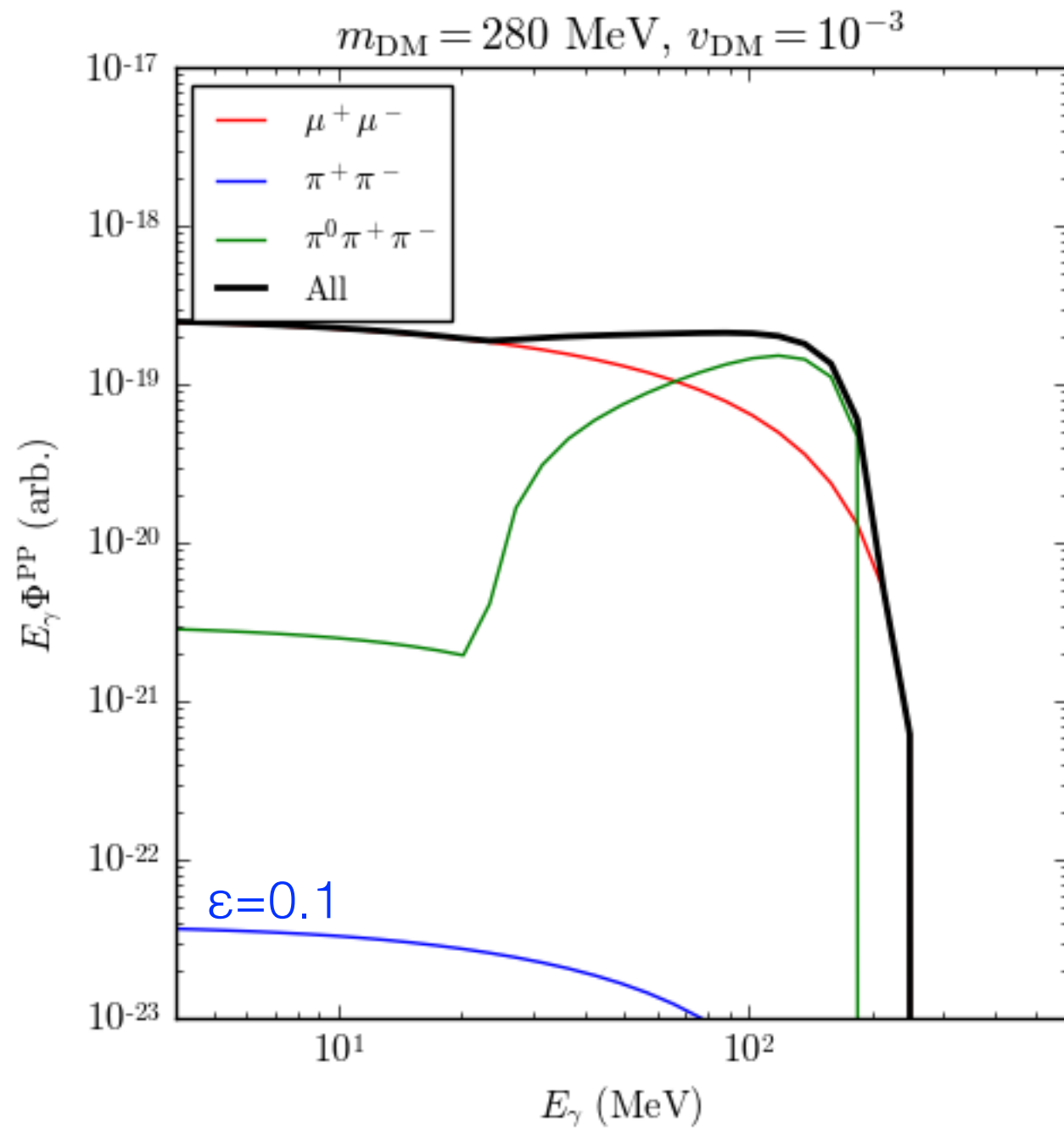


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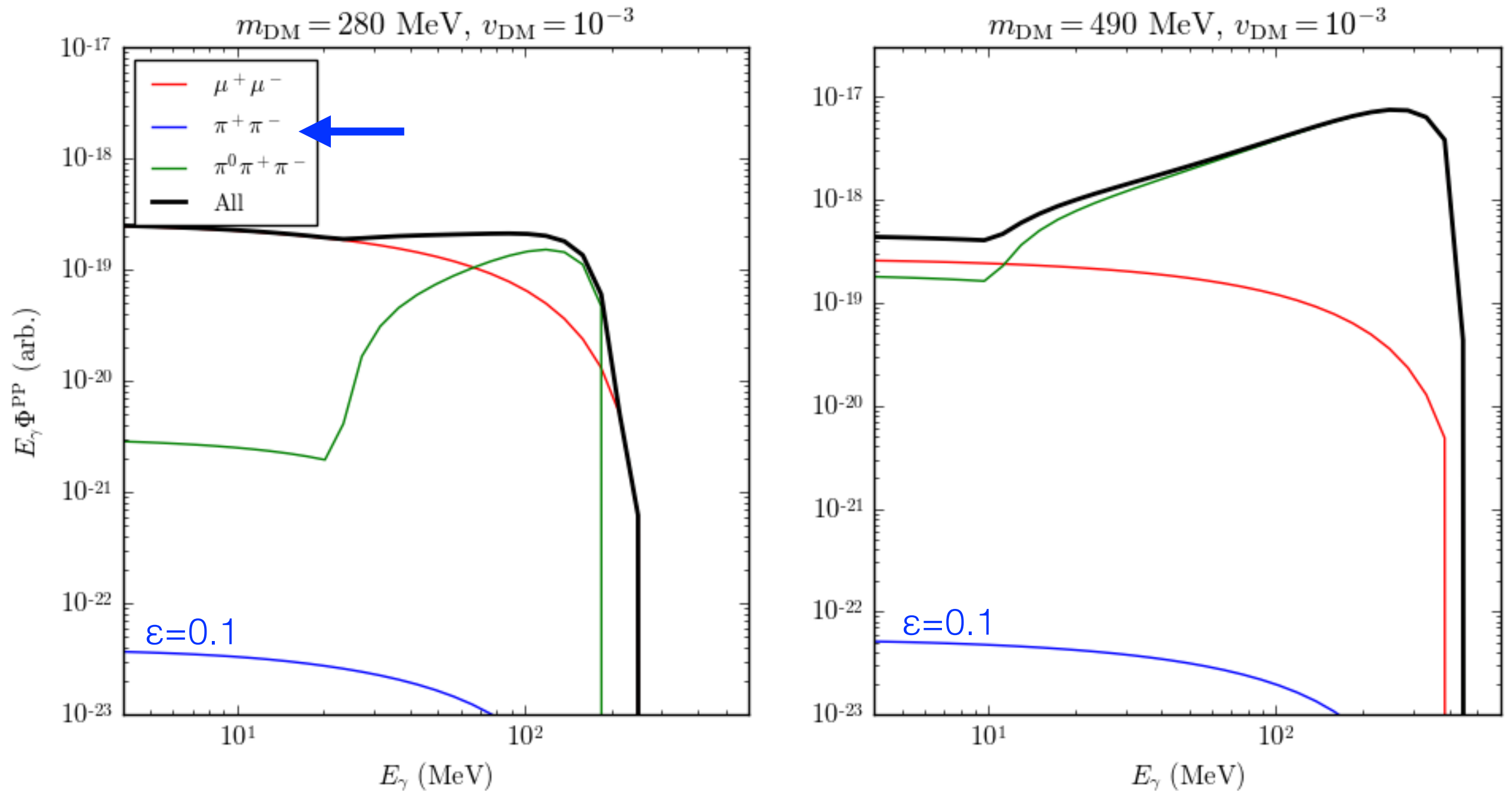


Negligible

Vector mediator

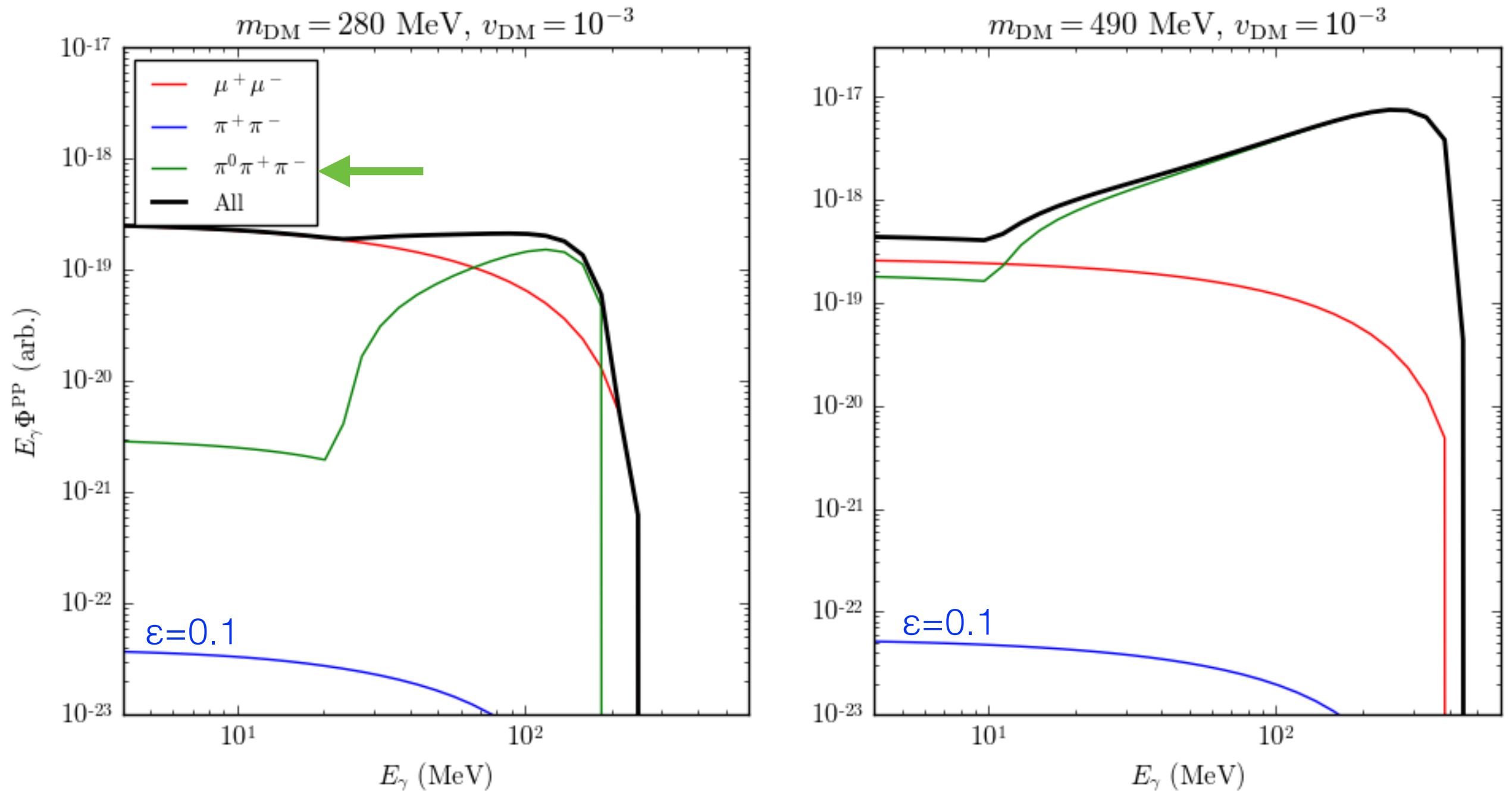


Vector mediator



Leading order in EFT, but subdominant here!

Vector mediator



Important due to cross section, π^0 spectrum

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- ChiPT: **consistent** framework for predicting these models' γ ray signatures
 - Required to correctly compare final states
- More mediators and final states to come!

A close-up, profile view of a bald eagle's head, facing left. The eagle has a white head, a large yellow beak, and a yellow eye. Its dark brown feathers are visible on its neck and chest. The background is a blurred American flag with red and white stripes and a blue field with white stars.

Thanks!