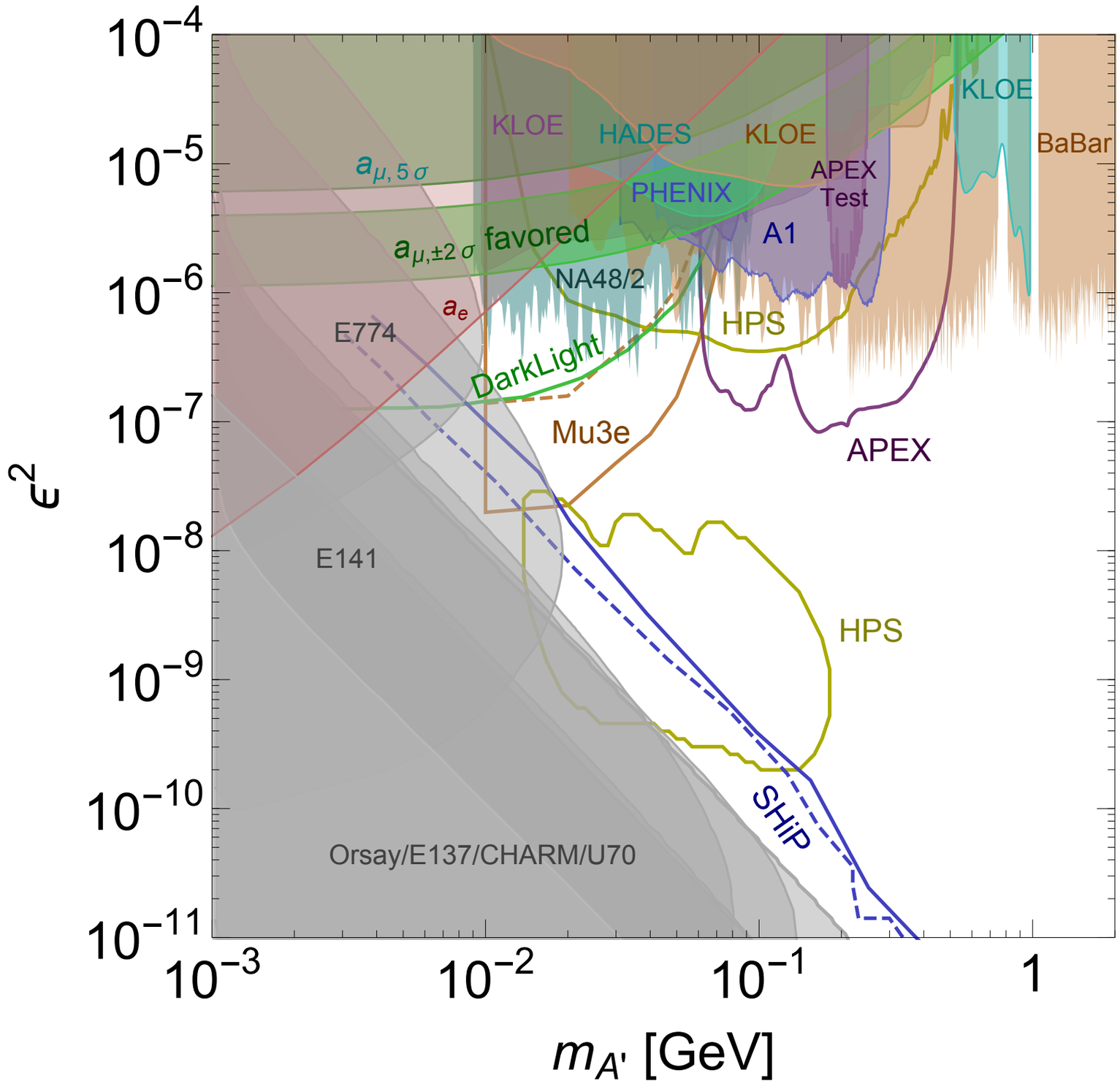
Brief wrap-up

Rouven Essig

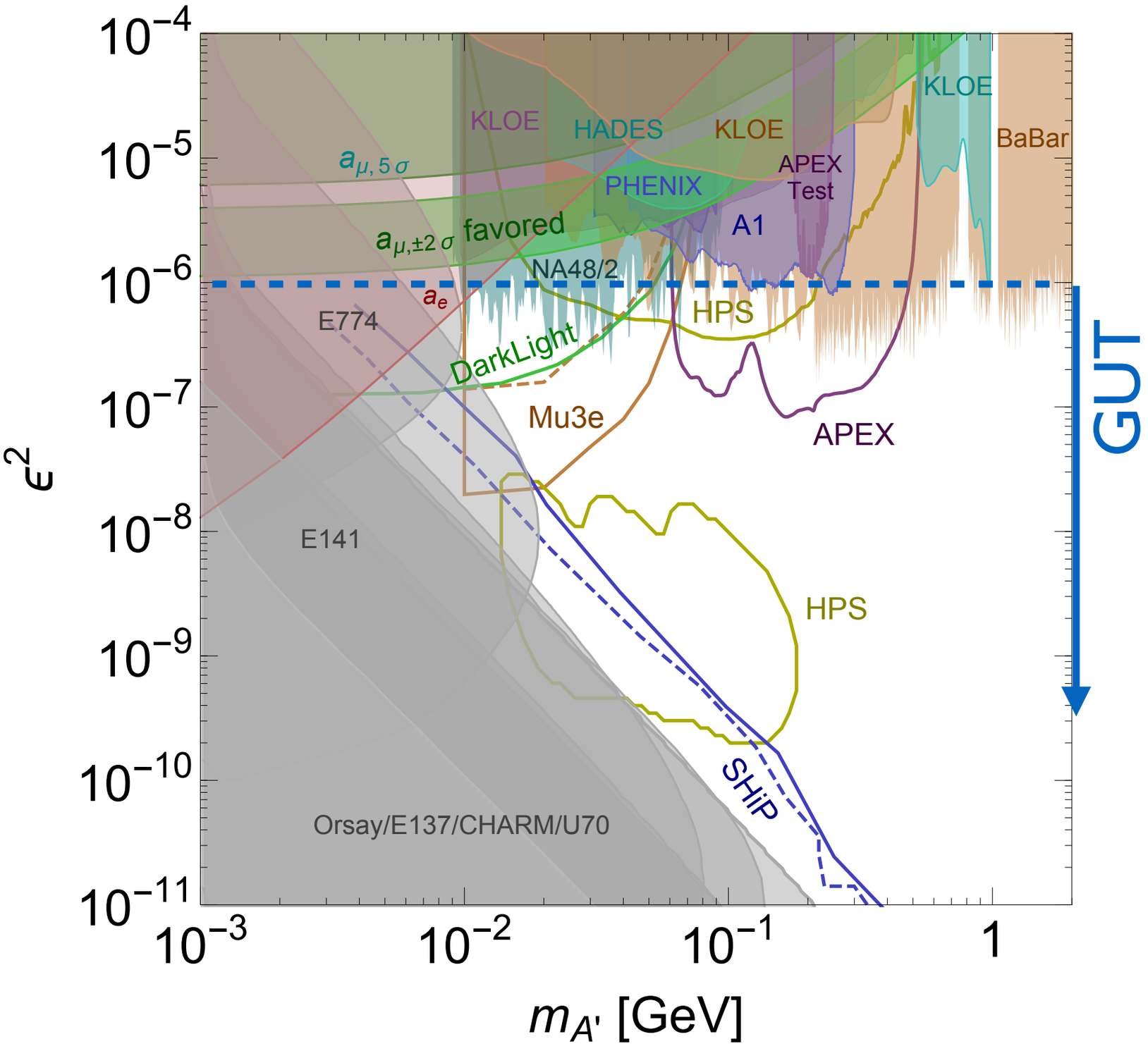
APEX Collaboration Meeting, JLab 4/20/2015

APEX: unique + important reach



unique reach
at high masses

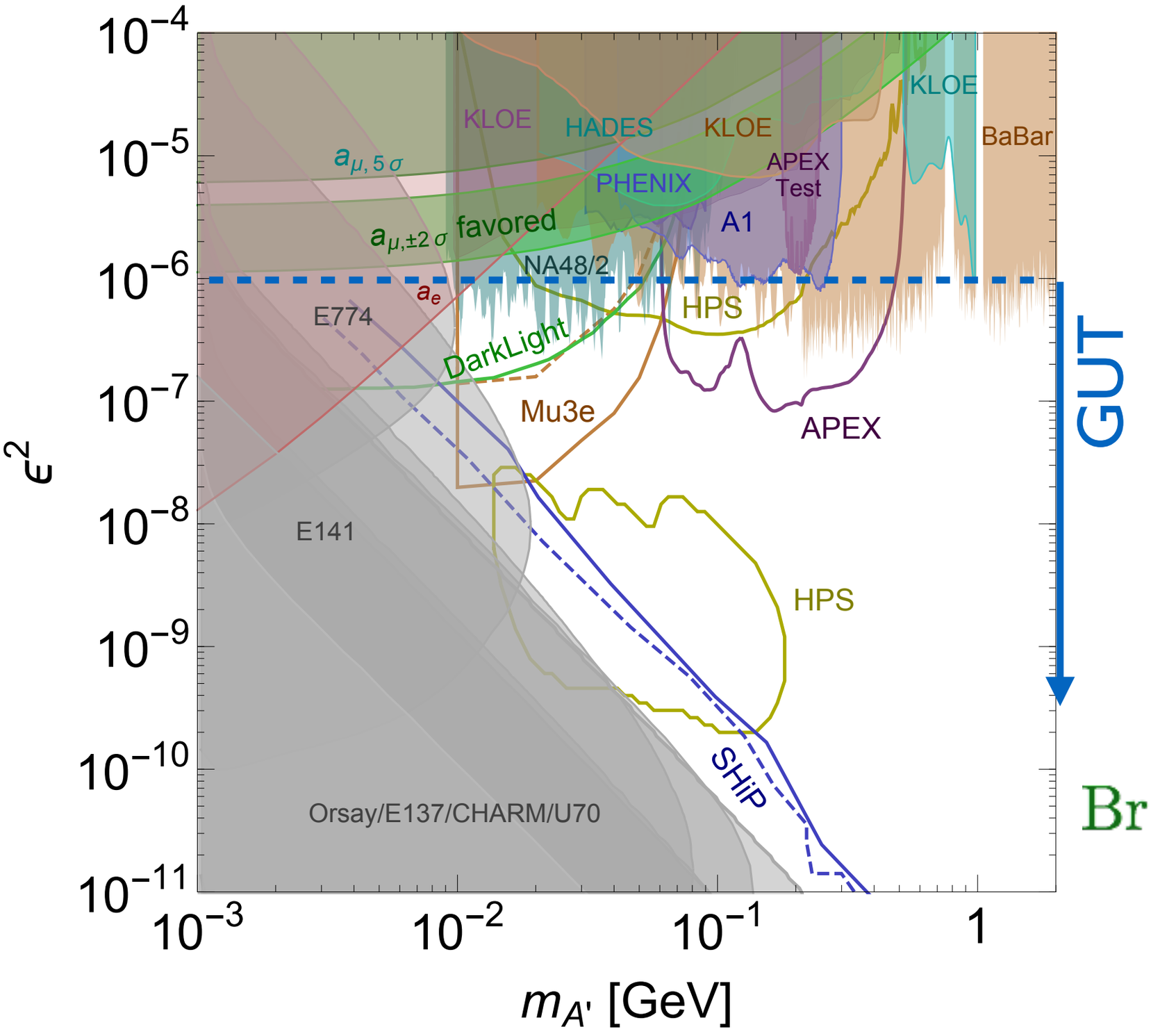
APEX: unique + important reach



unique reach at high masses

reach ε region expected from GUT symmetry

APEX: unique + important reach



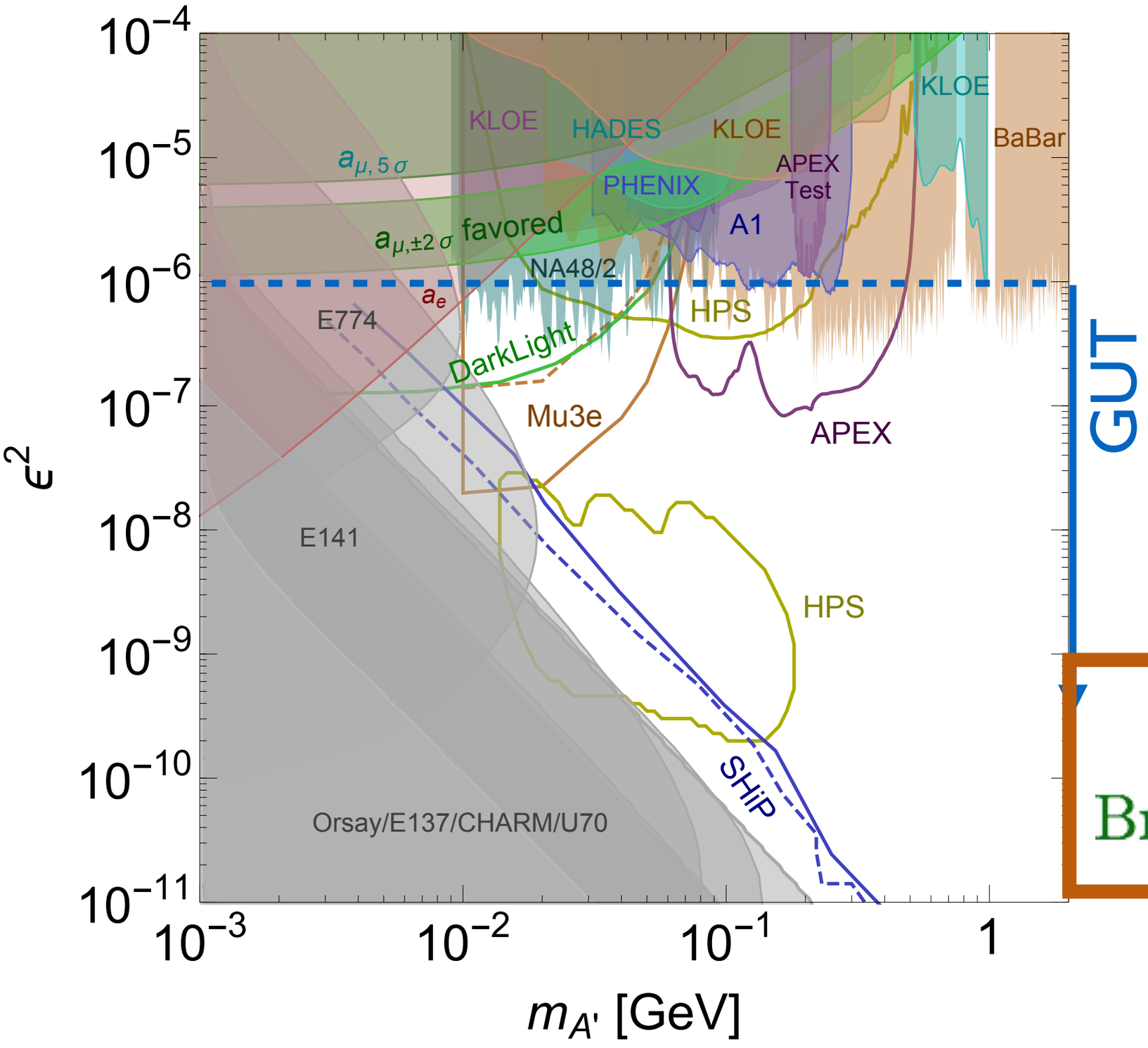
unique reach at high masses

reach ε region expected from GUT symmetry

can probe g-2 for

$\mathrm{Br}(A' \to \mathrm{visible}) \gtrsim 1\%$!

APEX: unique + important reach



unique reach at high masses

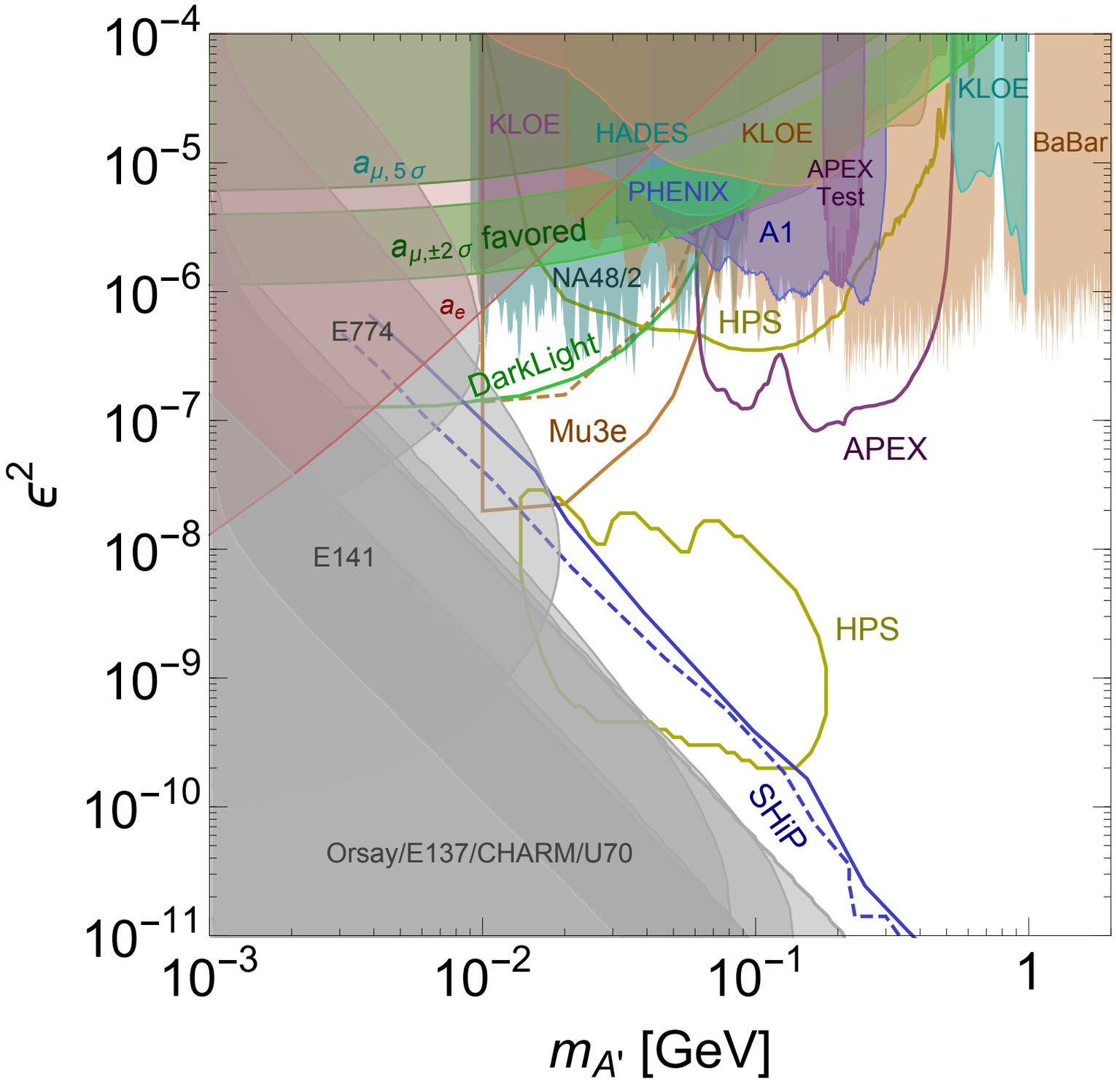
reach ε region expected from GUT symmetry

can probe g-2 for

$\mathrm{Br}(A' \to \mathrm{visible}) \gtrsim 1\%$!

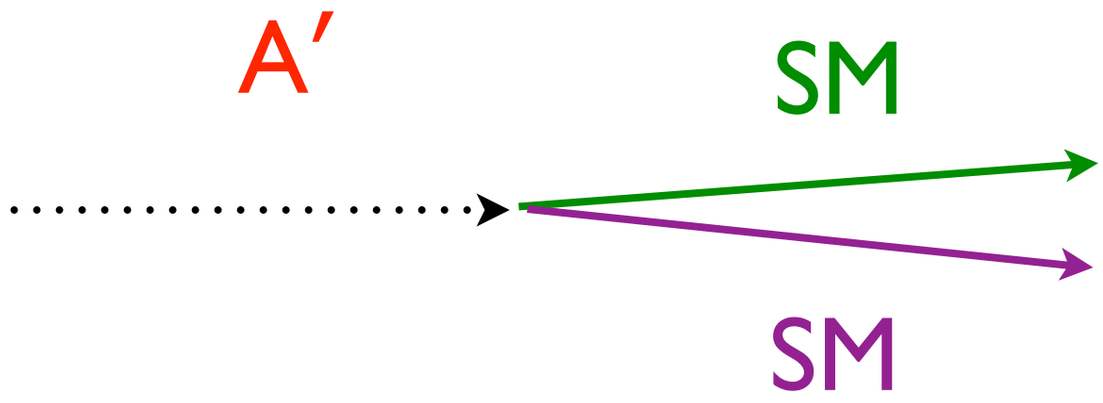
interesting possibility!

Assume A′ → Dark Matter is possible

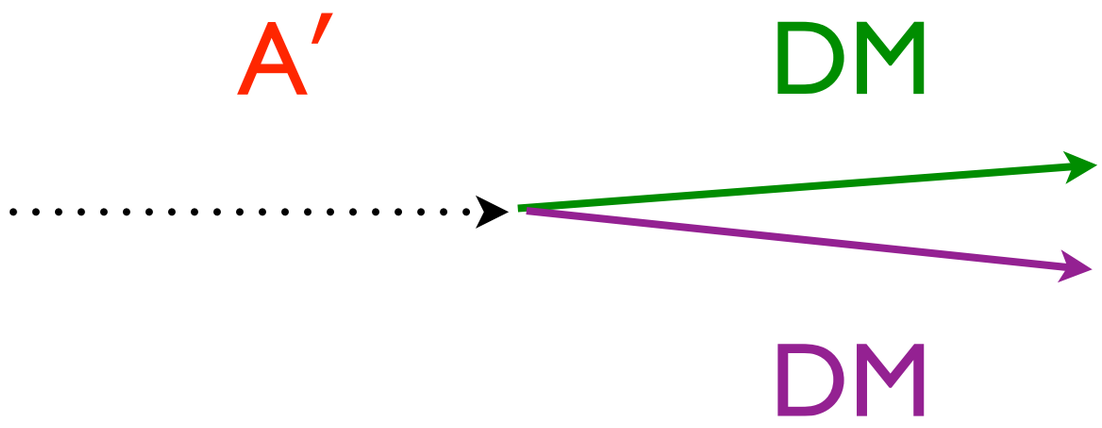


Then many constraints here weaken/ disappear!

Assume A′ → Dark Matter is possible

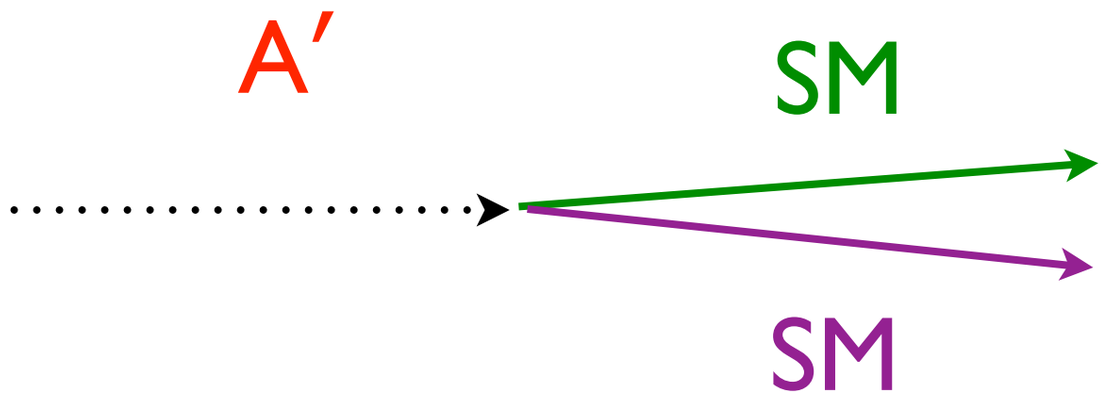


Controlled by ε

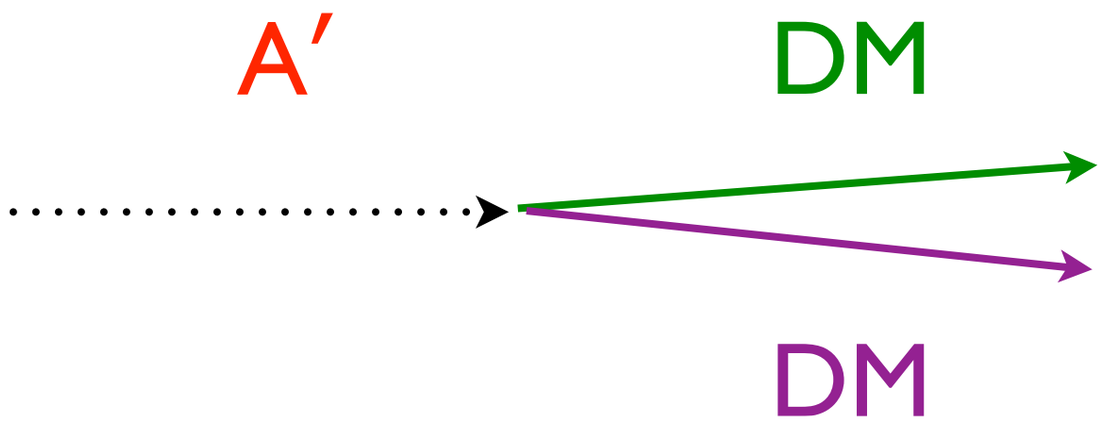


Controlled by α_D

Assume A′ → Dark Matter is possible



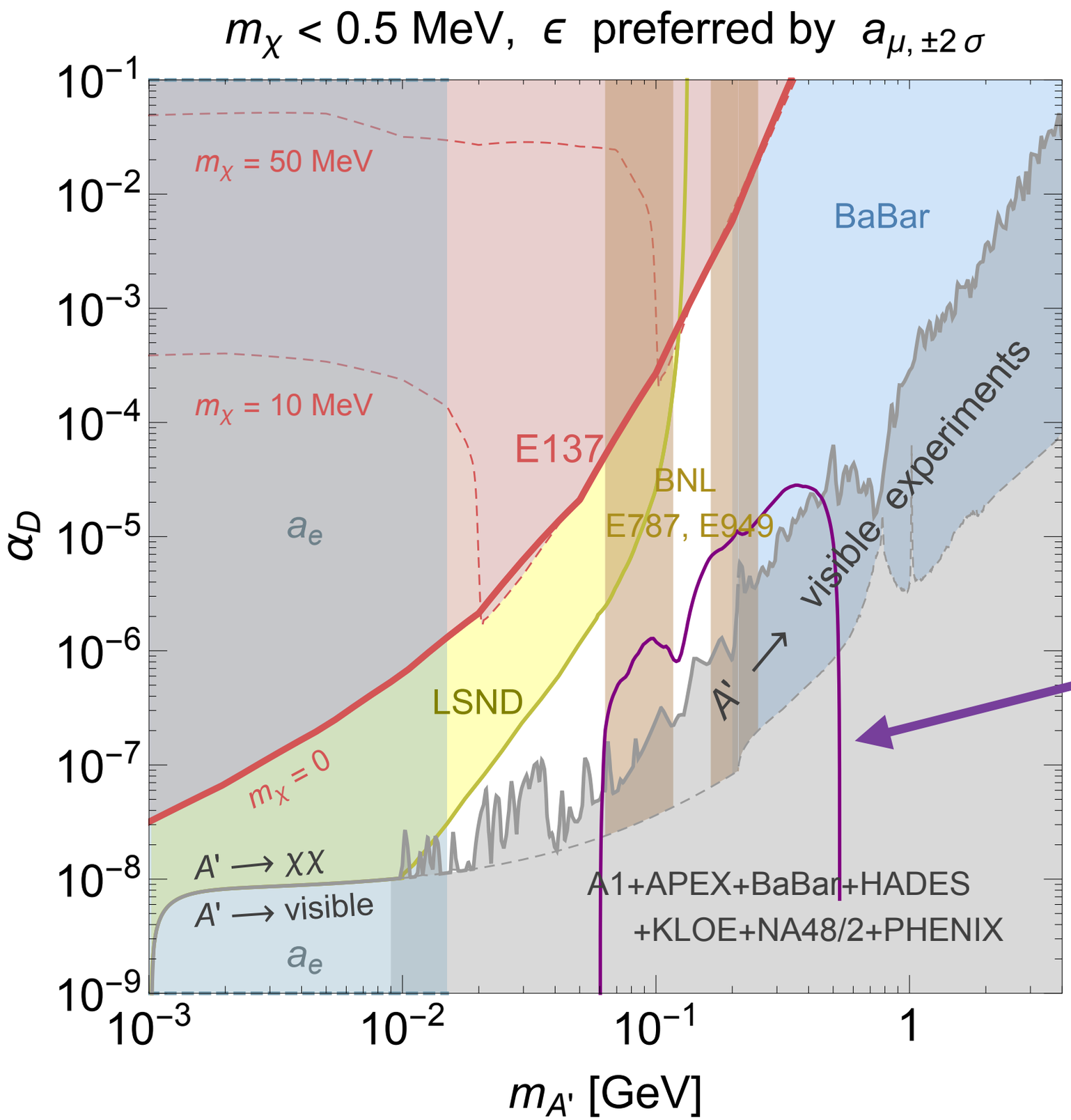
Controlled by ε



Controlled by α_D

now fix ε to explain g-2…

Constraint on g-2 region



APEX

Hall A Projected Experiment Schedule, updated 2/2015

- available on Hall A wiki

	Spring	Fall	Spring	Fall	Spring	Fall
CY 2015	DVCS – I/ GMp	DVCS – I/ GMp				
CY 2016			DVCS – I/ GMp [APEX]	^{3}H/^{3}He group (1+1+2)		
CY 2017					^{3}H/^{3}He group (1+1+2)	*APEX* *PREX12* *CREX* A_1^n *Ar(e,e'p)* *DVCS-II*

slide from Thia's talk

CY 2018 SBS start?

- Experiments listed in italics represent potential schedule options, in no order
- Red indicates PAC41 High Impact Experiments including SBS G_e^p
- Purple indicates new experiments approved by PAC42
- Blue indicates potential back-up experiment

Recent progress

- HRS electronics upgrade, the beam test was performed in 2014, 2015
- Septa magnet designed, ordered, delivered in 11/2014, test is under way
- Power supply for 2 kA, 650kW (SBS) delivered, accepted
- Scintillator Fiber hodoscopes constructed, new electronics tested
- Vacuum chamber design is completed, 2/3 ordered
- Corrector magnet design is in the detail stage

slide from Bogdan's talk

APEX E&D Items Remaining

- Corrector magnet(s)
- Vacuum extension box
- Support for extension box
- Support for magnet
- Target
  - motion
  - cooling
  - Shielding
- Power
  - supply
  - Magnet
- Walter
  - supply
  - magnet
- Sieve holders and fiducialization
- Shielded beam pipe?

To do 1

summary from Thia's talk

To do 2

- schedule readiness review
- students/advisors: think about thesis projects and discuss with spokespeople
- subgroups (target, SciFi, analysis, radiation shielding, VDC analysis, …) have made progress and know what needs to be done

To do 3

APEX: Technical publications and reports

- APEX proposal: JHEP 1102 **(2011) 009,** [arXiv:1001.2557]
- Data from test run reported in 2010 workshop
- PRL paper got 120+ citations
- Sophisticated bump search procedure, unpublished
- New hardware development: septa and SciFi, unpublished
- Progress with the DAQ readout speed, unreported
- New MC results, need to be published

slide from Bogdan's talk

Upcoming APEX Meetings

- Bi-weekly meetings: we'll continue w/ these on Thursdays. Next one May 7th.
- Collaboration meeting: Spring 2016… unless we run then, in which case we'll meet again in 2015!

Thank you!