

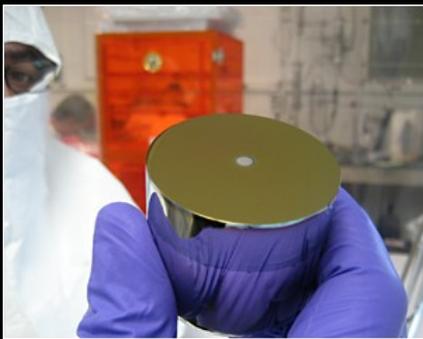
# What can we learn about dark matter from CoGeNT?

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Phenomenology Symposium 2011

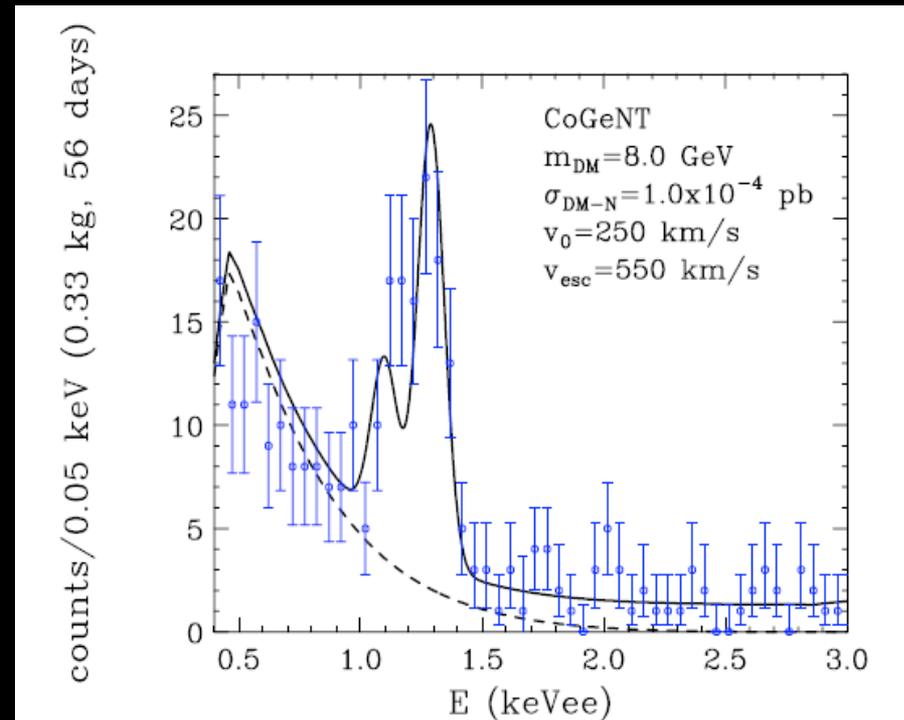
Monday, May 9

Chris Kelso

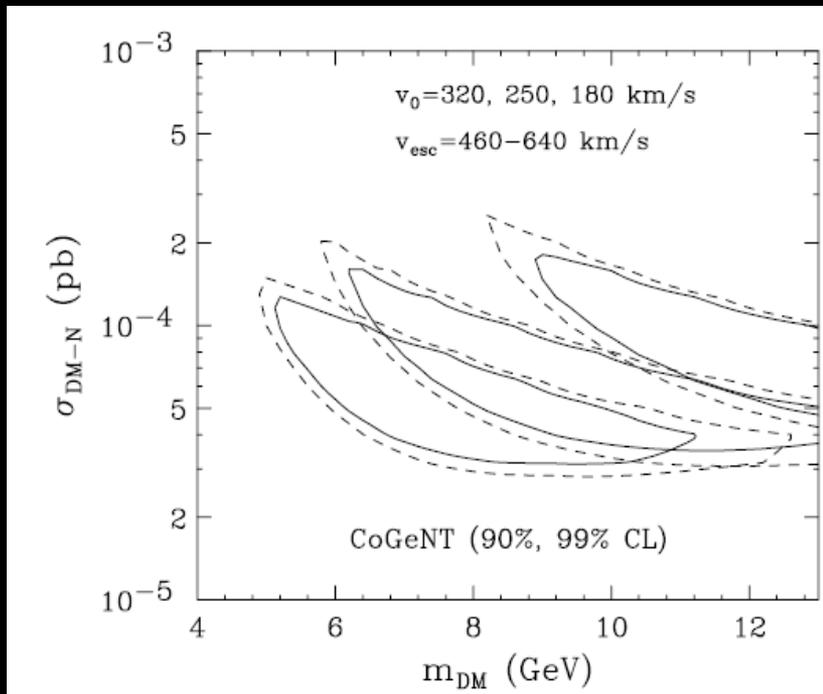


# Current CoGeNT Excess

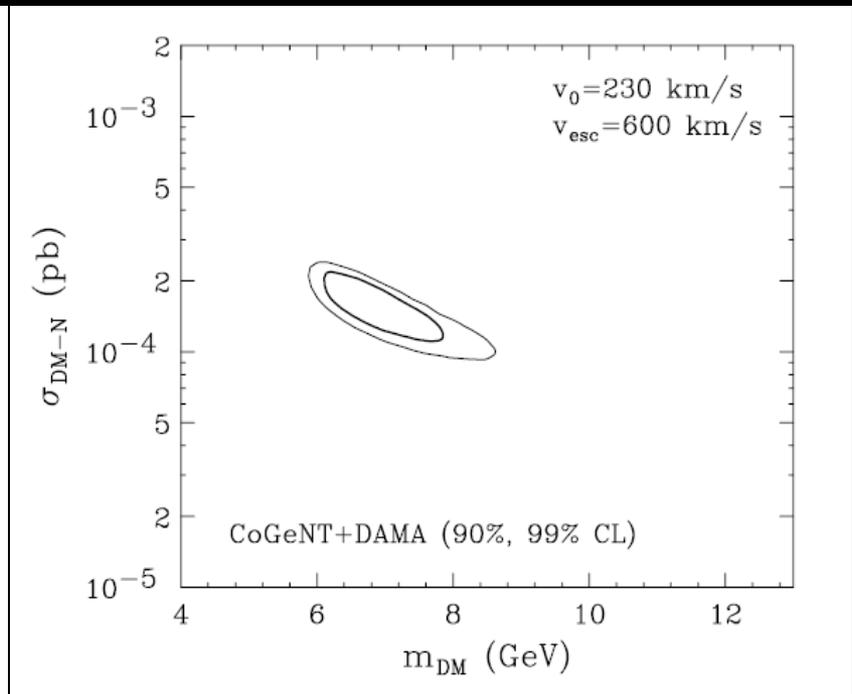
- Approximately 100 events above known backgrounds over 56 days of data
- Data is well fit well by elastically scattering dark matter plus backgrounds (2 L-shell peaks + constant)
- Dashed line is the dark matter signal alone
- Juan Collar recently reported modulation of the signal at  $2.8 \sigma$  confidence level



# CoGeNT excess in the mass, cross-section plane

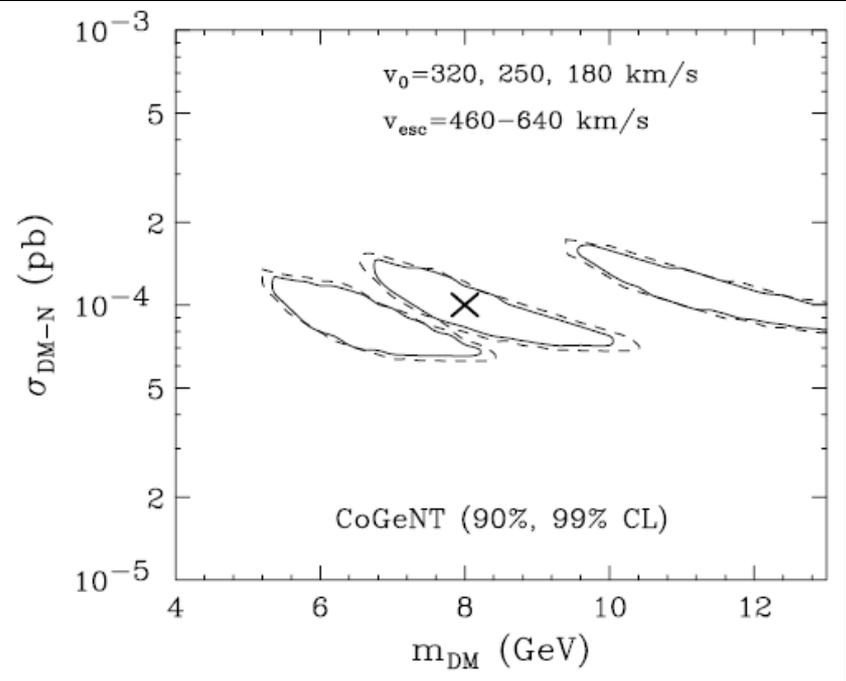
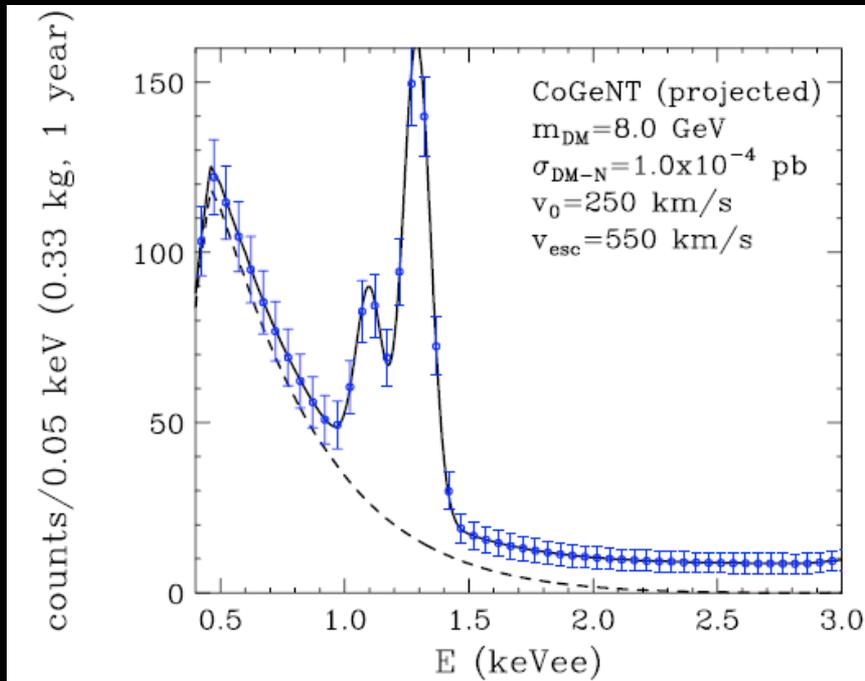


Within the standard halo model, the elastic cross section is constrained within an order of magnitude

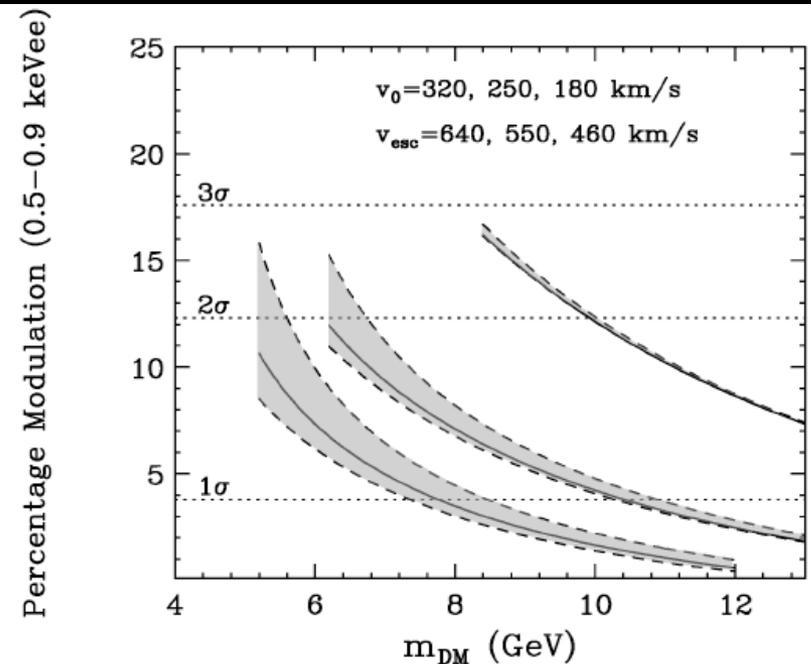
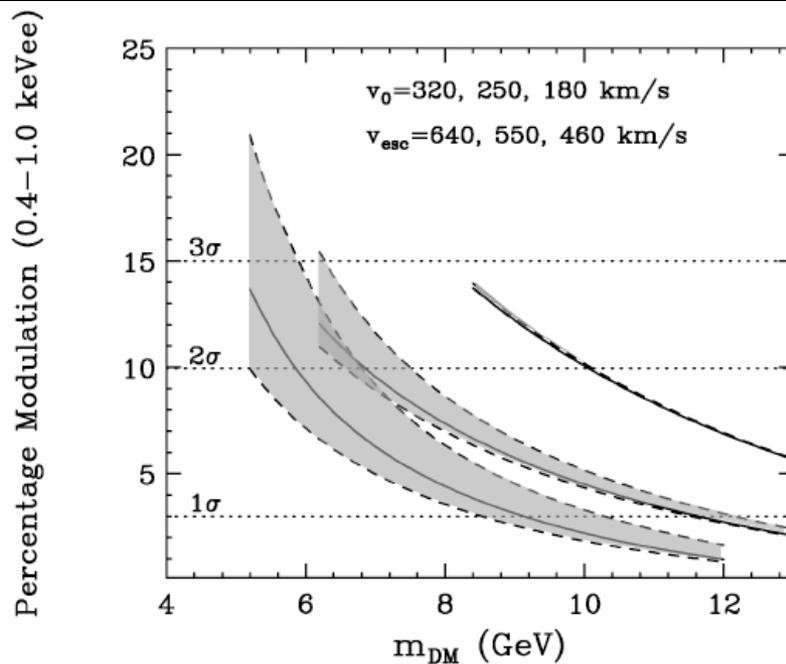


There is a region that could produce both the CoGeNT excess and the DAMA modulation

# CoGeNT after 1 year

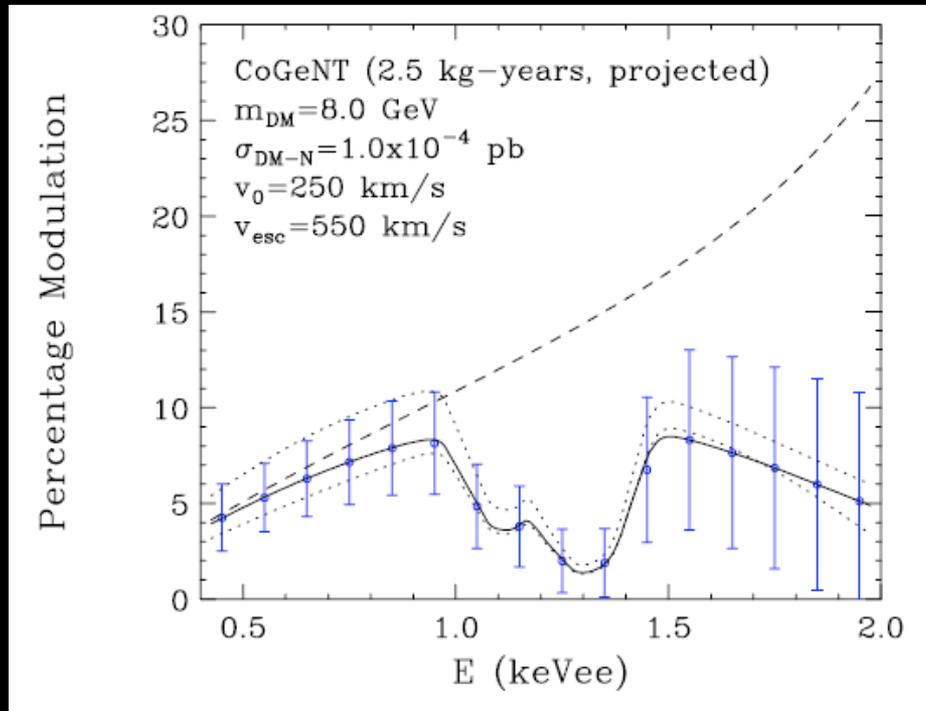


# CoGeNT after 1 year: Annual Modulation

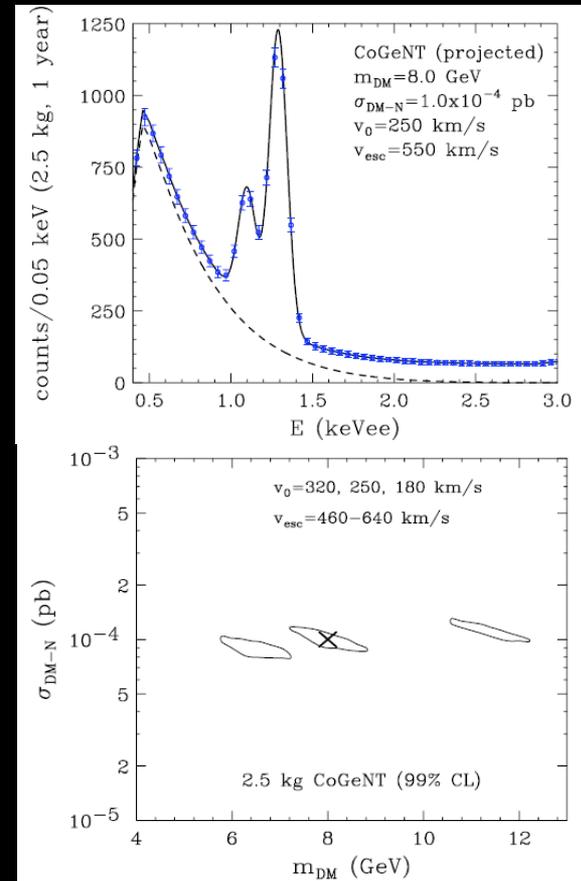


These confidence levels normalize the winter rate to 100 events in 56 days

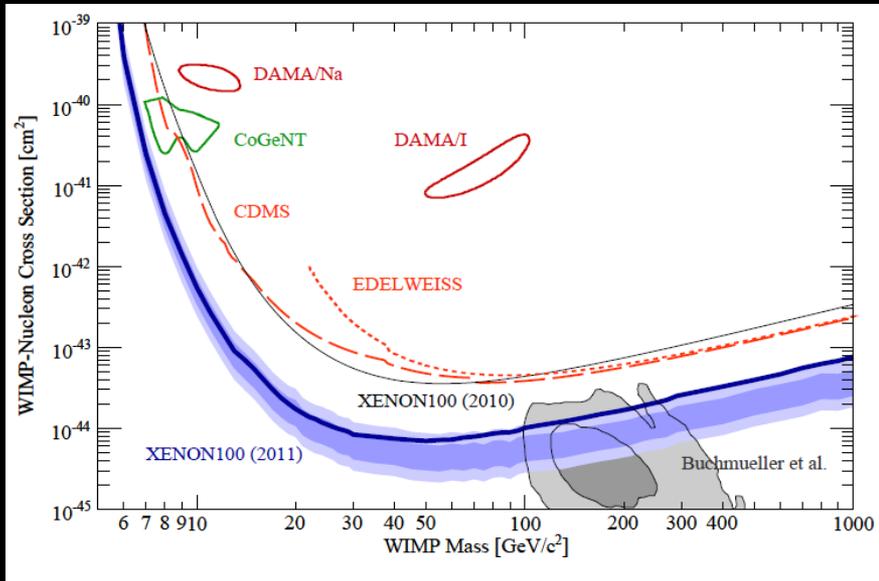
# Upgrade to CoGeNT: C4



C4 would be able to measure the spectrum of the annual modulation

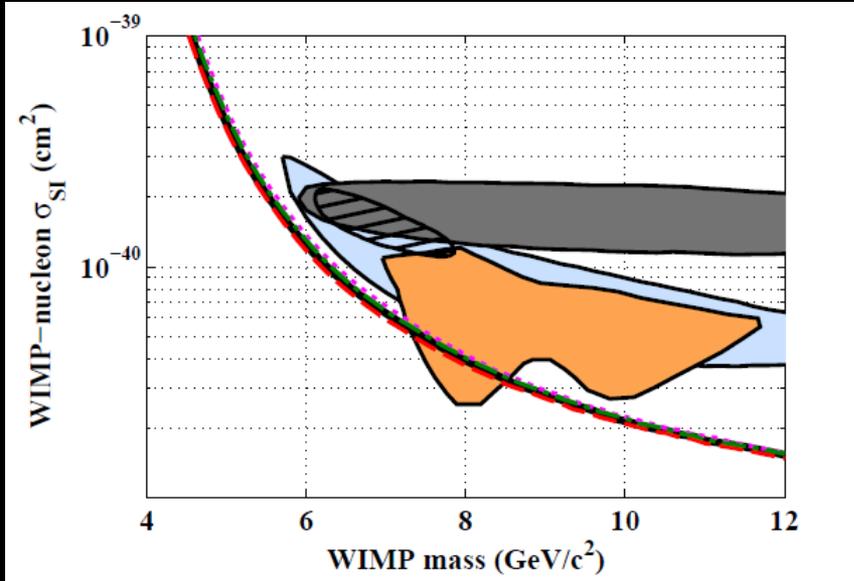


# Other Experiments



arXiv:1104.2549v1

Recent Xenon100 data claims to exclude CoGeNT parameter space, but the low energy response of liquid Xenon is not well measured at this time.



arXiv:1011.2482v3

CDMS (Ge) low energy analysis results are in conflict with dark matter interpretation of CoGeNT excess, and both are still under debate.

# Conclusions

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- The current 56 days of data already constrains the elastic cross section to within a factor of 10
- The upcoming year's worth of data will constrain the parameters even further
- This data will also provide the opportunity to measure the annual modulation (reported at the  $2.8 \sigma$  level at the recent APS meeting)
- Planned upgrade to C4 will allow a measurement of the spectrum of the modulation