Dark Matter circle: http://wiki.lam.fr/geco/DarkMatterCircle (E. Nezri)

14 people subscribed to the geco_dm list, meet every second Friday at 15:00h

8 meetings sofar - most meetings ~ 1 hour or slightly more

~ 3-4 staff (depending on availability)

~ 1-2 postdocs

~ 2-3 students

Topics: anything to do with DM (astrophysics, astroparticles, physics)

(sub)Haloes features (simulations, lensing, RC ...)

Galaxy formation <-> dark matter

Galaxy dynamics <-> dark matter

Relic density

Nature of dark matter

Structure formation

Detection aspects (methods, targets, estimations)

News from HEP (models, candidates etc)

...

Most frequent format: presentation/discussion of arXiv papers
Most frequent topic: core/cusp issue in haloes

effort made to explain central problems:

- core/cusp problem (cf. following slides)
- galactic center problem (and similar problem in other galaxies)
- formation/evolution of MW type galaxies
- galaxy cluster simulations (triaxial shapes, not settled)
- other dark matter distribution question (clumps, dark disc ...)
- dark matter detection
- presentation of new work, including student work

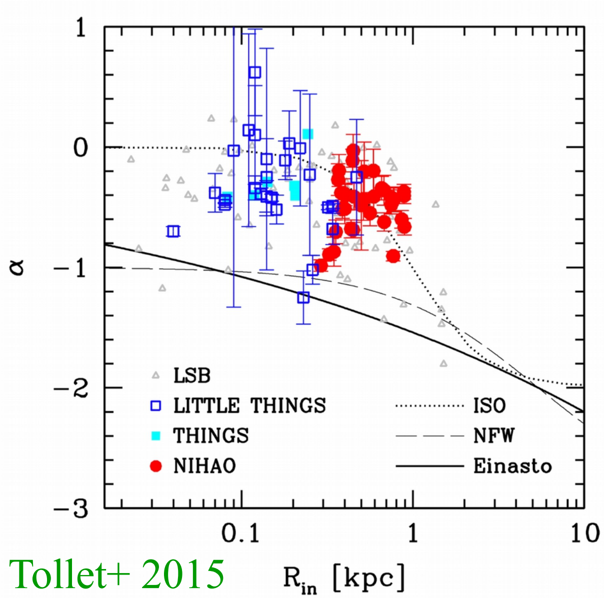
B-mol (common with other circles?)

- relative lack of student/postdoc initiative to bring papers of their choice

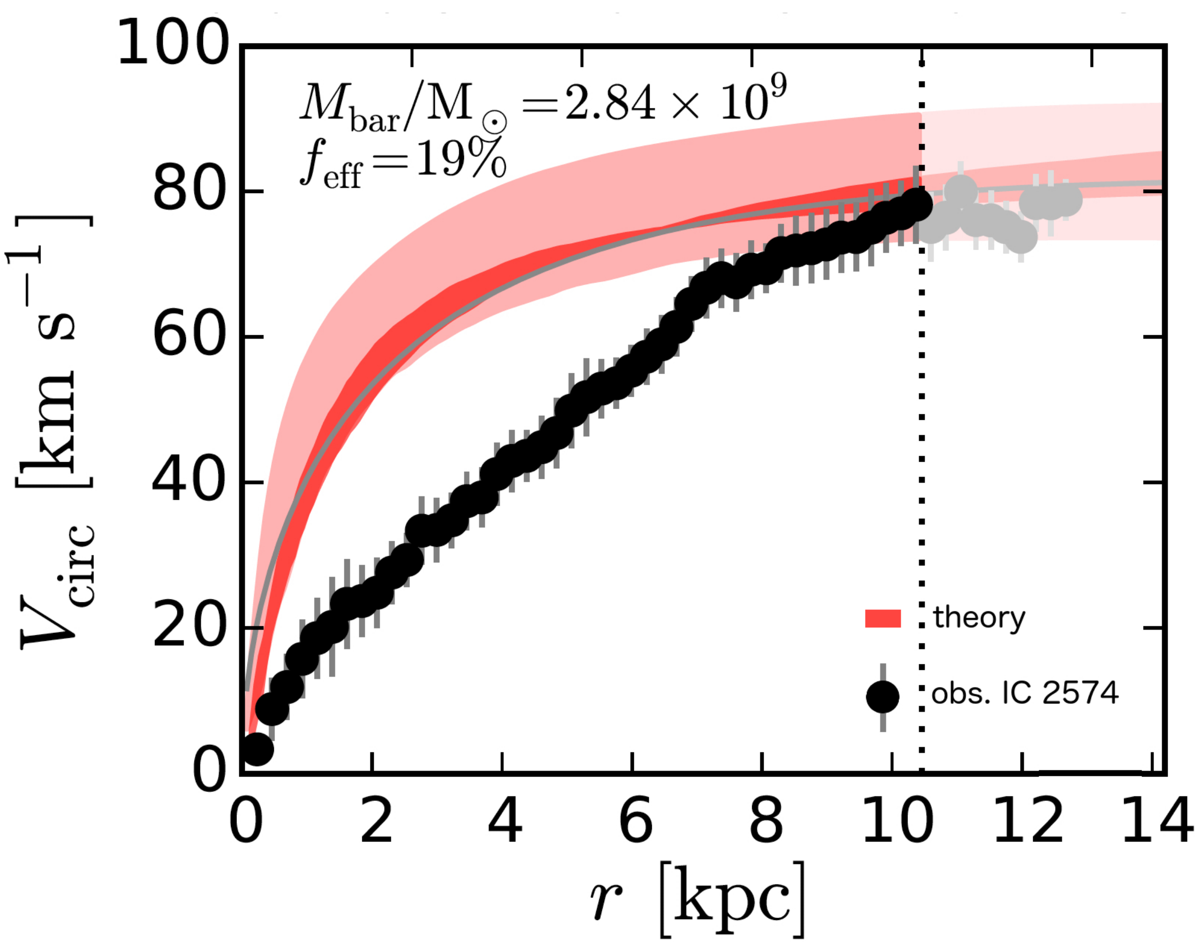
Dwarfs are dark matter dominated, thus useful for core-cusp debate

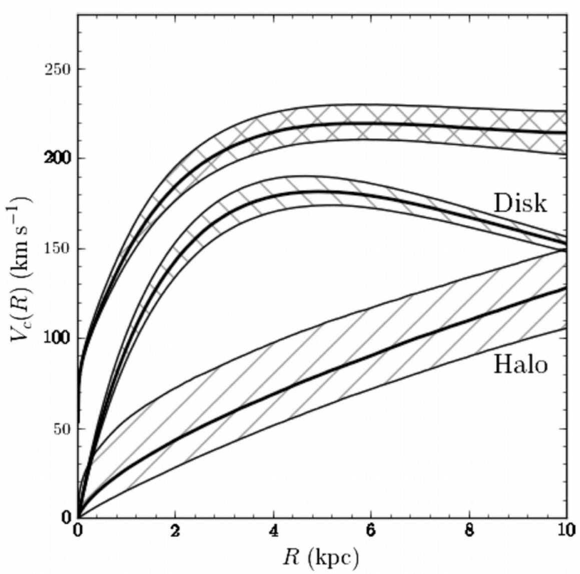
Oman et al. ArXiv:1601.01026

"vexing problem" ? - challenge



Tollet+ 2015

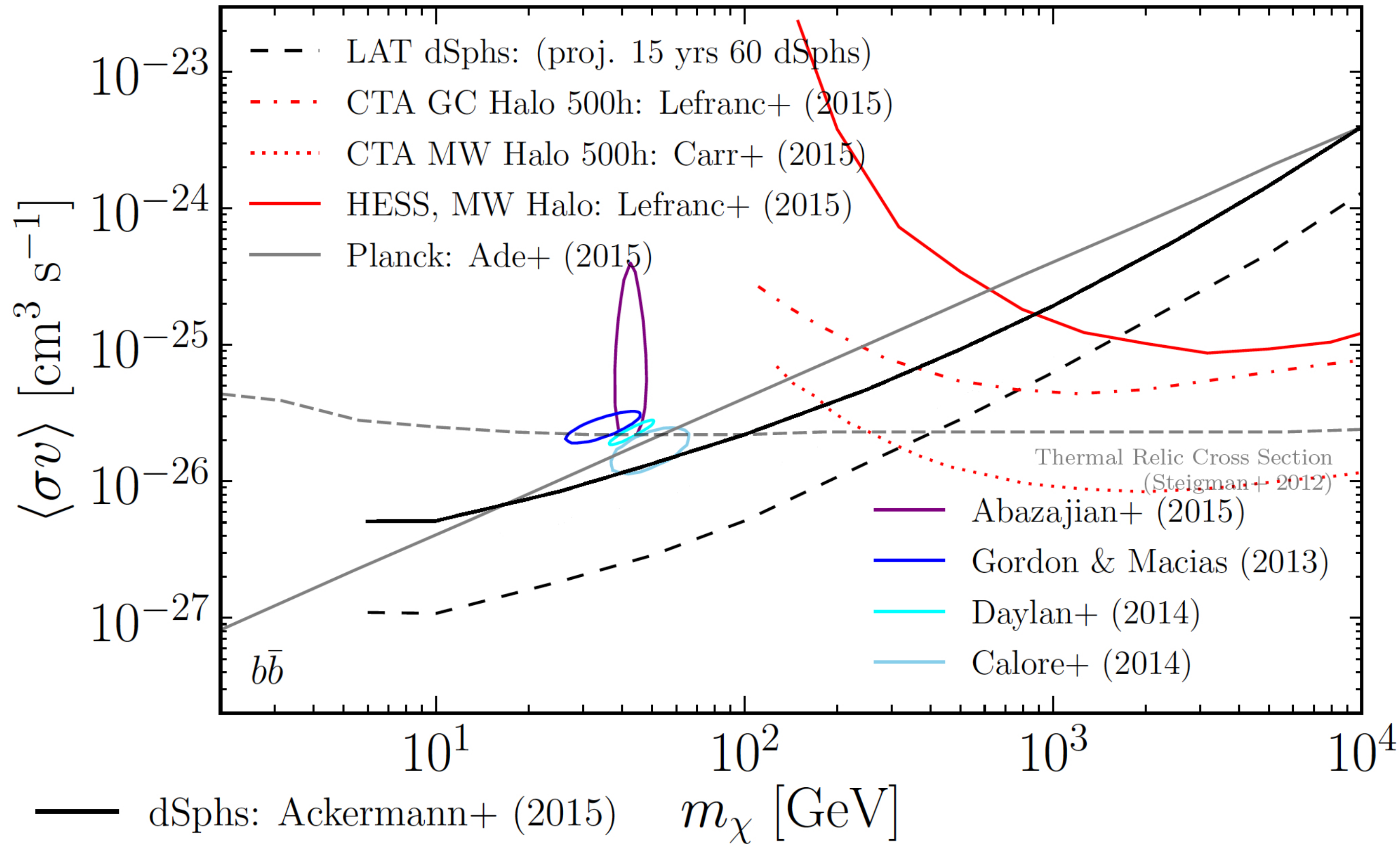




For the Milky Way, Bovy & Rix (2013) find a near-maximum disk, not very compatible with LCDM. This will be further sorted out by GAIA and other galactic archeology surveys

Kinematic data indicate that the dwarf spheroidal satellite galaxies (dSphs) of the Milky Way contain a substantial DM component [6, 7]. The gamma-ray signal flux at the LAT, ϕ_s $(\mathrm{ph\,cm^{-2}\,s^{-1}})$, expected from the annihilation of DM with a density distribution $\rho_{\mathrm{DM}}(\boldsymbol{r})$ is given by

$$\phi_s(\Delta\Omega) = \underbrace{\frac{1}{4\pi}\frac{\langle\sigma v\rangle}{2m_{\mathrm{DM}}^2}\int_{E_{\min}}^{E_{\max}}\frac{\mathrm{d}N_\gamma}{\mathrm{d}E_\gamma}\mathrm{d}E_\gamma}_{\text{particle physics}} \times \underbrace{\int_{\Delta\Omega}\int_{\mathrm{l.o.s.}}\rho_{\mathrm{DM}}^2(\boldsymbol{r})\mathrm{d}l\,\mathrm{d}\Omega'}_{\mathrm{J-factor}} . \quad (1)$$



DES J2356-5935 (Tucana III); $(\alpha_{2000}, \delta_{2000}, m-M) = (359^\circ.15, -59^\circ.60, 17.01)$

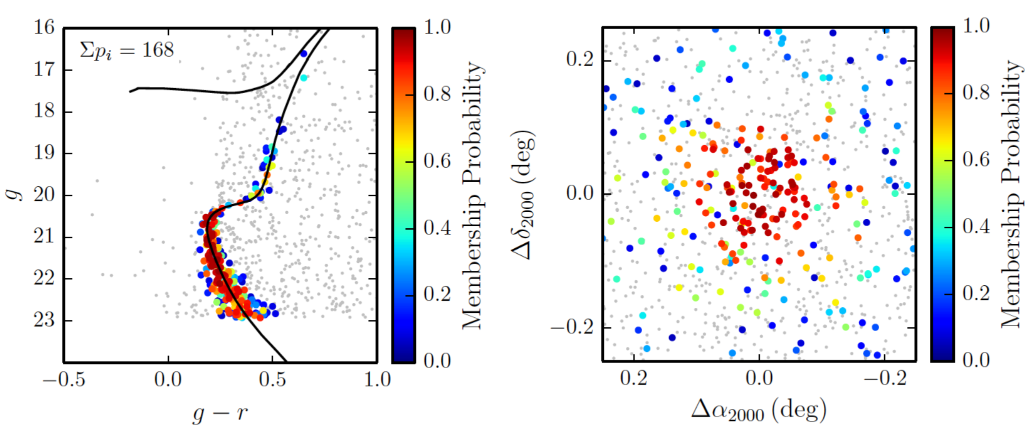
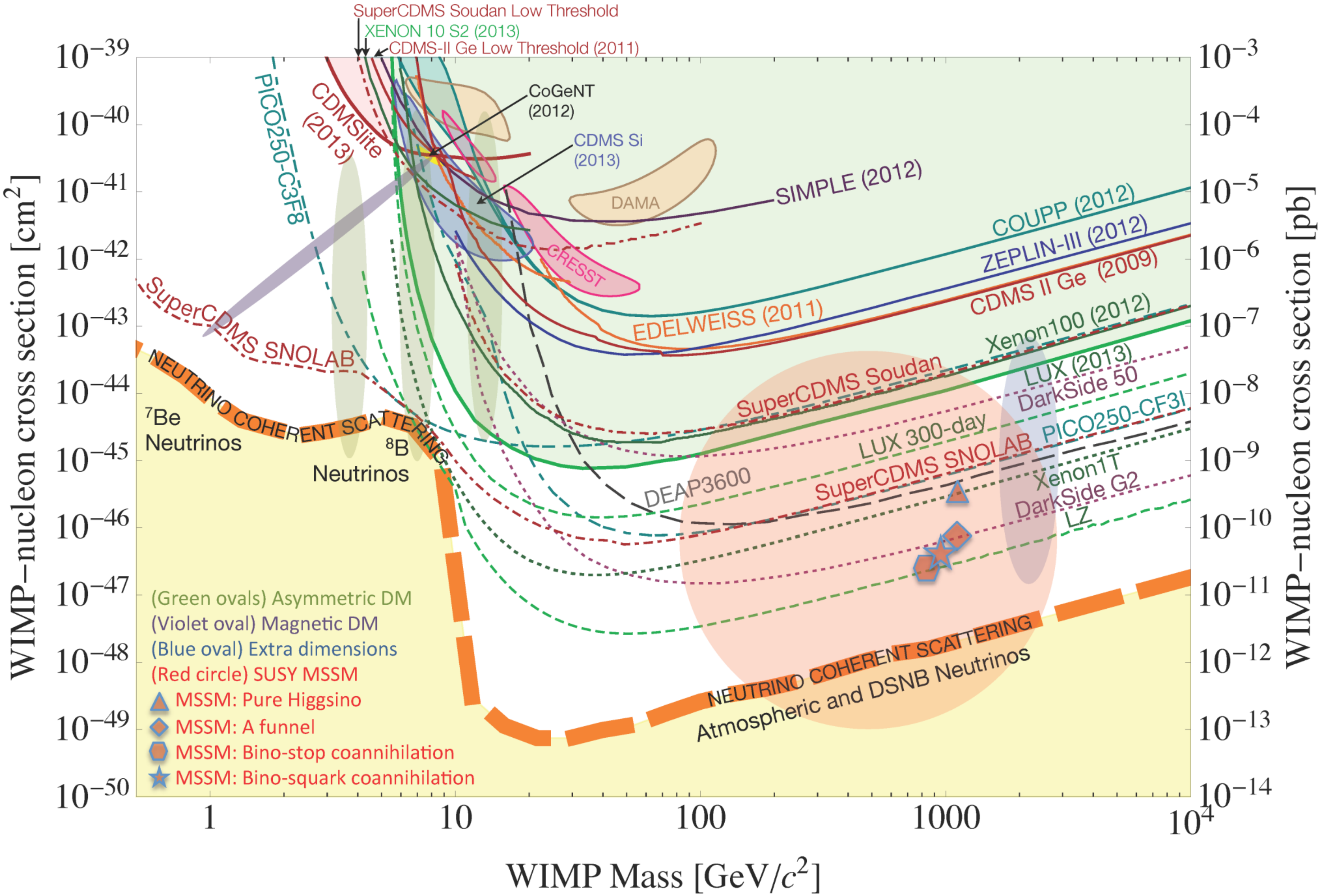


TABLE I. Properties of Milky Way dSphs.

Name	ℓ^a (deg)	b^a (deg)	Distance (kpc)	$\log_{10}(J_{obs})^b$ ($\log_{10}$[GeV^2 cm^{-5}])	Ref.
Bootes I	358.1	69.6	66	18.8 ± 0.22	[41]
Canes Venatici II	113.6	82.7	160	17.9 ± 0.25	[42]
Carina	260.1	−22.2	105	18.1 ± 0.23	[43]
Coma Berenices	241.9	83.6	44	19.0 ± 0.25	[42]
Draco	86.4	34.7	76	18.8 ± 0.16	[44]
Fornax	237.1	−65.7	147	18.2 ± 0.21	[43]
Hercules	28.7	36.9	132	18.1 ± 0.25	[42]
Leo II	220.2	67.2	233	17.6 ± 0.18	[45]
Leo IV	265.4	56.5	154	17.9 ± 0.28	[42]
Sculptor	287.5	−83.2	86	18.6 ± 0.18	[43]
Segue 1	220.5	50.4	23	19.5 ± 0.29	[46]
Sextans	243.5	42.3	86	18.4 ± 0.27	[43]
Ursa Major II	152.5	37.4	32	19.3 ± 0.28	[42]
Ursa Minor	105.0	44.8	76	18.8 ± 0.19	[44]
Willman 1	158.6	56.8	38	19.1 ± 0.31	[47]



SuperCDMS Soudan Low Threshold
XENON 10 S2 (2013)
CDMS-II Ge Low Threshold (2011)
CoGeNT (2012)
CDMS Si (2013)
PICO250-C3F8
CDMSlite (2013)
DAMA
SIMPLE (2012)
COUPP (2012)
ZEPLIN-III (2012)
CDMS II Ge (2009)
CRESST
EDELWEISS (2011)
Xenon100 (2012)
SuperCDMS SNOLAB
NEUTRINO COHERENT SCATTERING
SuperCDMS Soudan
LUX (2013)
DarkSide 50
PICO250-CF3I
LUX 300-day
SuperCDMS SNOLAB
Xenon1T
DarkSide G2
LZ
DEAP3600
7Be Neutrinos
8B Neutrinos
(Green ovals) Asymmetric DM
(Violet oval) Magnetic DM
(Blue oval) Extra dimensions
(Red circle) SUSY MSSM
MSSM: Pure Higgsino
MSSM: A funnel
MSSM: Bino-stop coannihilation
MSSM: Bino-squark coannihilation
NEUTRINO COHERENT SCATTERING
Atmospheric and DSNB Neutrinos
WIMP–nucleon cross section [cm2]
WIMP–nucleon cross section [pb]
WIMP Mass [GeV/c2]