



JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Wrap-up

Dark Matter in the Milky Way Mainz, May 2-13 2016

SOC: Di Cintio, Iocco, Pato, Weniger

Workshop funded by MITP

Things we have learned

Baryons are crucial in any simulation to understand DM distribution.

Identification of MW-like halo currently does not follow one single criteria.

The "center" (< 1kpc-ish) of MW-mass Galaxy is not suff. resolved in hydro-sims to be univocally agreed upon (contraction/expansion).

Impact of AGN feedback on MW-like galaxies yet unclear. Field in infancy.

Baryon and WDM effects are degenerate down to scales observable right now.

Which f(v)? Simulations agree on sizable difference between CDMO and Hydro case. What about Hydro with (SIDM/WDM)? Effects on DD?

Things we have learned

DM is beyond WIMP paradigm: non-thermal, PBH, sterile neutrinos, gravitinos...

SUSY is not generally dead (and never will be). But your favorite model may be.

Galactic Center (gamma-ray) emission can not be explained by current astrophysics, it is solid against systematics, and pretty well characterized. GC excess lives.

Low-mass WIMP situation unclear:

Intrinsic confusion from experimental data;

Potential effects on small-masses (only) from f(v).

Neutrino floor is a real bummer for DM direct detection (but: directionality, modulation, spectrum and non-standard interactions).

Project brainstorming

Effect of contraction vs expansion on the metallicity gradients of the inner region of Milky Way: can we get a signature of different contraction/expansion looking at different simulations? (Brook)

Study the contraction vs expansion in MW galaxies as a function of radius. Plot Mhydro(r)/Mdm(r) vs r/R200 (Dutton)

Compare the several current MW simulation results: density profile, uncertainties, upper and lower limit on inner slope (Calore)

Determine a common criterion to define the Milky Way (Bozorgnia)

Derive the f(v) of MW with different simulations (CDM,WDM,SIDM + baryons) (Cerdeño, Di Cintio)

Comparison project to understand the effect of AGN at MW scales (Marinacci)

Check if the scatter in V2kpc-Vmax is similar/different between the various simulations and how we can explain it (Oman)

Close to the neutrino floor, can we disentangle neutrino new physics and WIMP scattering? (Kopp)

Open problems

soon...

never?

simulations

- cdm substructure role

- sub-100 pc resolution

- constrain feedback

- impact of AGN feedback

- gas distribution in halos

- cusp-core problem

- sidm plus baryons

dm searches

- 3.55 keV line

- galactic centre emission

- dm bound states

- low-mass wimps

- positron excess

- prejudice in dm modelling

- dm quantum numbers

astro data

- how many satellites

- local dm density

- local dm f(v)

We work hard, we party harder

