

$$\frac{dN}{dE d\Omega} = \Phi_s = \frac{1}{4\pi} \frac{\langle \sigma v \rangle}{2M_0 \beta} \int_{E_{min}}^{E_{max}} \frac{dN_\gamma}{dE_\gamma} dE_\gamma \int_{\Delta\Omega} \left(\int_{LOS} \rho^2(r) d\Omega \right) dR$$

Φ_{sp} SPECTRAL CHARACTER (PARTICLE PHYSICS) LINE OF SIGHT
 SPATIAL DIST. OF DM, ρ

Today: DWARF SPHERICALS: GALAXIES ORBITING MILKY WAY
 ↳ "substructure"

1. DM DOMINATED (MASS:light ≥ 10)
 2. little / NO STARS BG (NO PULSARS) ← too few to give BG.
- ↳ any flux you see → expect to be DM

HI GALACTIC LAT, NO MW BG.
 VERY LITTLE GAS, NOT MUCH STAR FORMATION

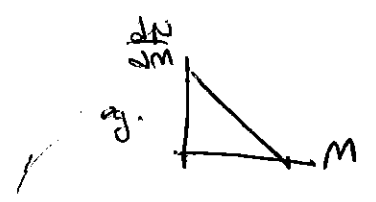
eg. Fornax, most luminous $10^5 \odot$

[working def: things fermi can see ↔ IRAY]
 30 MeV ? UP?

SIMULATIONS

CDM: > 10^{10} "PARTICLES", SA $10^2 - 10^3 M_\odot$

↳ > 10^{54} DM PARTICLES
 STATE OF THE ART MILKY WAY SIZED GALAXY (AQUARIUS SIMULATION)



- GET:
1. DENSITY PROFILES dn/dm HOW MANY SUBHALOS OF GIVEN MASS
 2. (MASS FUNCTION) & AMOUNT OF SUBSTRUCTURE

→ A LITTLE ABOUT VEL. DISTRIBUTION (D.D.) ← ID DEP ON PROCESS (P-WAVE)

LARGE SCALE SCFUC: AGREES w/ CDM

SMALL SCALE (CSPH REGIME) HAS ISSUES.

↑ w/m resolution

these simulations are just ~~collisionless DM~~ collisionless DM

(ccdm)

DM PREDICTS: $\rho \sim r^{-1}$ NFW $\leftarrow \rho(r) = \frac{\rho_s}{\frac{r}{r_s} (1 + \frac{r}{r_s})^2}$

↑ simulation

↑ ~~cusps~~ CUSP

OBS: PREFER CORES, STILL CONSISTENT w/ CUSPS.

Baryons: NO CONSENSUS ON HOW TO IMPLEMENT

~~Volker "best way"~~

GAS SIMULATIONS HARD

[VOLKER CODE IS "BEST," BUT NOT PUBLIC]

EITHER { CUMPS of GAS
OR DISCRETIZE SPACE → core movies

SOME PROCESSES ~~ADIBATIC~~ CAN AFFECT CENTRAL DENSITY

↳ ADIAB. CONTRACTION (CUSPY) BRINGS BARYONS TO SUPERNOVAE FEEDBACK (CORES) EJECTS MATTER BACK OUT
↳ drags DM.

@ this point: nobody can do everything correctly.

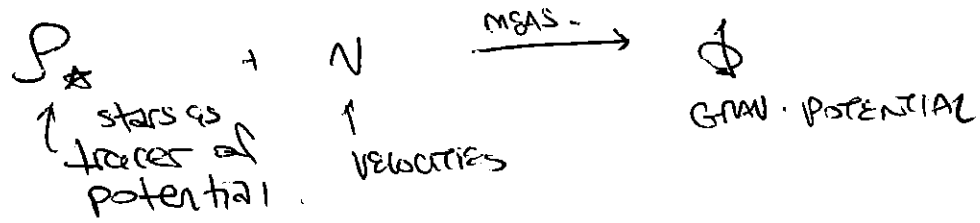
BOOST FACTOR: LUMPINESS OF SUBSTRUCTURE
REL TO SMOOTH HALO

↳ CAN INCREASE J B/C OF σ^2

\int dSph: $B \sim 1$
CLUSTERS: $B \sim 100 - 1000$ } have to extract.

Model J factor for dSph: JEANS MODELING

STELLAR LOS



20-25 00 STARS / GALAXY

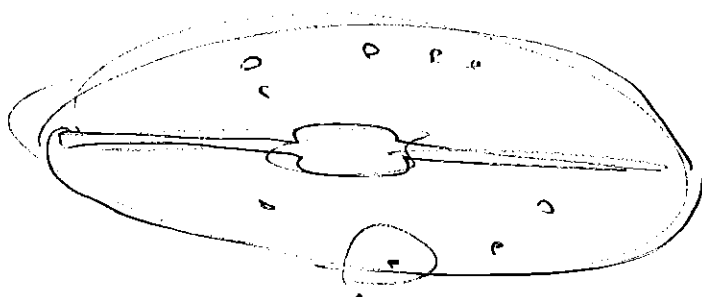
PROBLEM: tangential velocity / ENCLOSED MASS DEGENERACY
 ↳ MINIMIZED FOR A PARTICULAR MASS $M(r_{1/2})$
 (UCI RESULT)

Fermi - ALL SKY SURVEY → 1110.0828

J MEAS FROM IS dSph ↑ START ON TOP OF EA OTHER
 ↓
 REDUCES J ERROR

IDEA: TO GET f_s, f_b MEASUREMENT RE NEW PROFILE.

Fig 5:



FARM PICTURE

dSph. RG: $dR = 5''$ SNAPSHOT @ CENTER of dSph.
 SIGNAL: $dR = \sim 5''$

RESULT: Fig 5. $\langle \sigma \rangle$ vs MOM

↳ @ LOW MASS, SLIGHTLY DIFF FROM EXPECTED

	GC	8 kpc	} dist from us.
dSph. {	25 50-200	kpc kpc	

↑ } $\sigma \sim 1/r^2$

TO GIVE IDEA OF EXPECTED SIGNAL. MORE $\sim 1/1000$ SUPP IN DWARF.

WANT: FIND MORE HI- γ dSph like SEGWAY.