

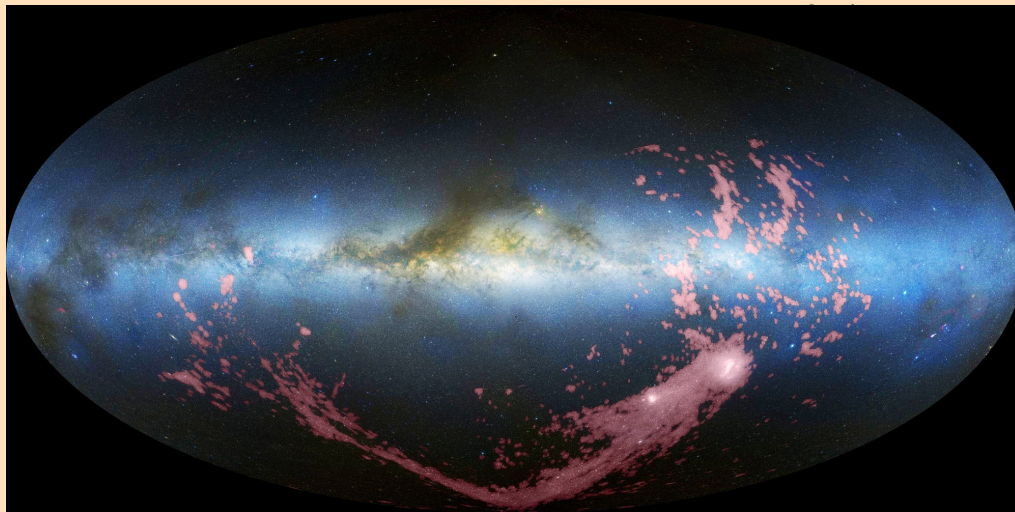
Chemodynamics of Dwarf Galaxies under Ram Pressure

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Submitted to *The Astrophysical Journal*.

MOTIVATION: Many dwarf galaxies are located in the vicinity of massive L_* galaxies. The presence of a massive galaxy can greatly affect the evolution of the dwarf companion.



The Magellanic Stream

Objective: to simulate the evolution of a dwarf galaxy as it orbits inside the gaseous halo of a massive L_* galaxy.

Method: high-resolution SPH simulation of the dwarf galaxy, with a semi-analytical treatment of the effects of the massive galaxy: tides, ram pressure, and pressure confinement \rightarrow "supergrid physics."

THE SIMULATIONS

● Dwarf

DM halo: $9.5 \times 10^9 M_{\text{sun}}$, represented with particles of mass $10000 M_{\text{sun}}$.

Disk: $5 \times 10^8 M_{\text{sun}}$ (50% stars, 50% gas), represented with particles of mass $1000 M_{\text{sun}}$.

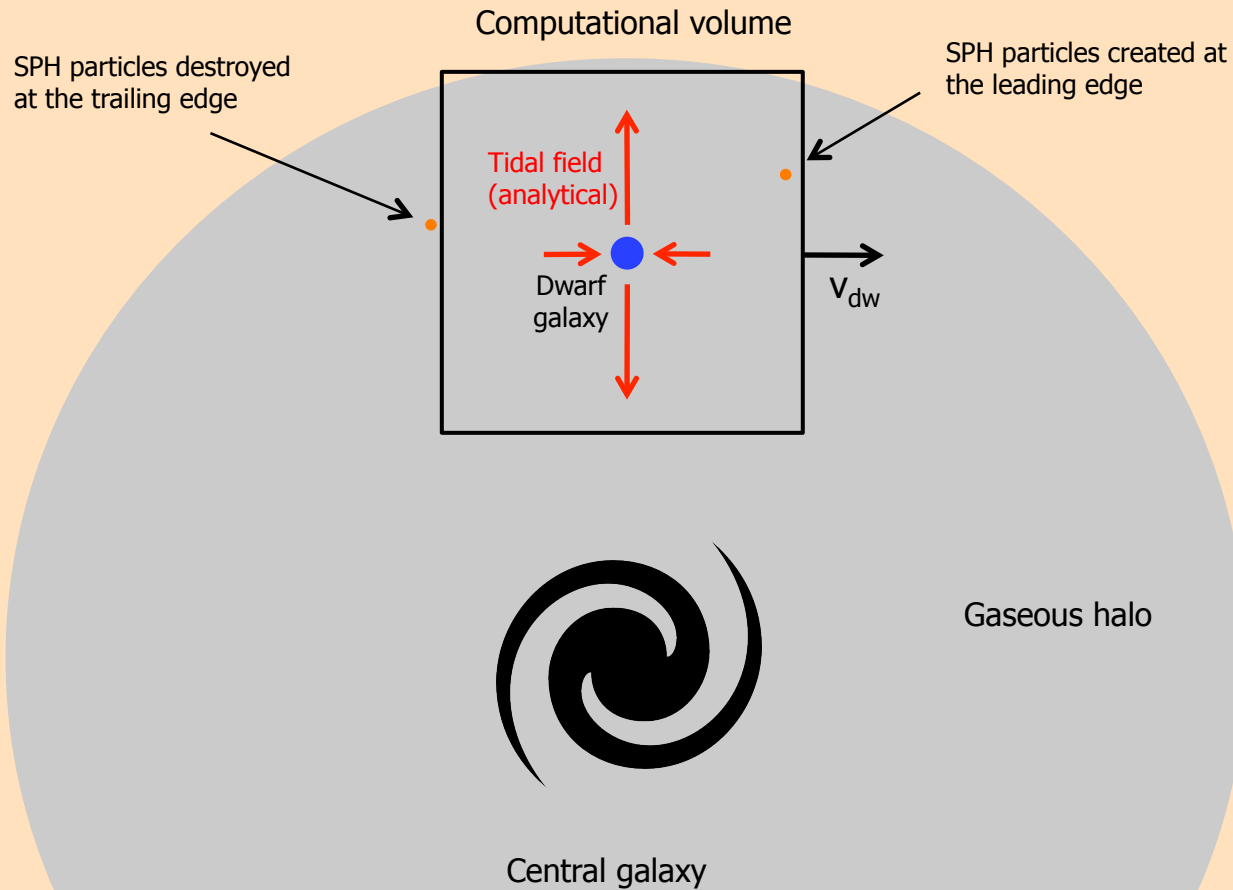


Central galaxy: 4 different models (2 masses $M_h \times 2$ gas fractions n_0).

Determines tidal forces, and orbital velocity of dwarf

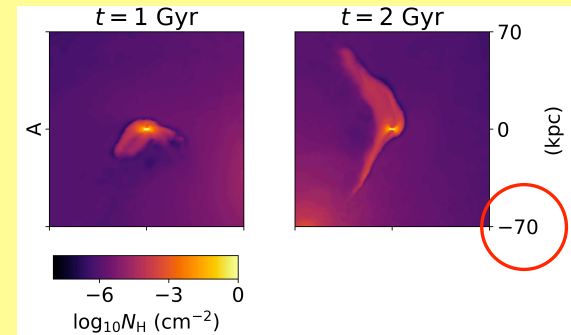
Run	M_h (M_\odot)	n_0 cm^{-3}	v_0 km s^{-1}	f_R	f_T	f_{RT}	P_C
A	10^{12}	0.460	190.0	1.000	1.00	1.00	1.00
B	10^{12}	0.046	190.0	0.100	1.00	0.10	0.10
C	10^{11}	0.460	72.8	0.147	0.17	0.86	0.15
D	10^{11}	0.046	72.8	0.015	0.17	0.09	0.02

Determines confinement pressure and ram pressure



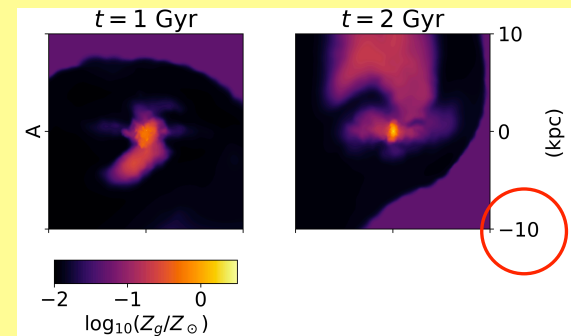
RESULTS

Column density of outflows.



Outflows from dwarf are stretched by tidal field and bent by ram pressure.

Metallicity of outflows.



Outflows are not very efficient in transporting metals.

Outflows are metal-rich compared to surrounding halo gas, but metal-poor compared to center of dwarf.

SNe enrich gas in the center of the dwarf galaxy, but gas near the surface of the dwarf is blown out.