Catalina Gómez

16/07/18

Defining the Local Group

Criteria

1. Impose cuts on the Dark Matter Halo Mass (Group_M_Crit200) and Stellar Mass (SubhaloMassInRadType).
2. Pair candidates bases on mutual proximity.
3. Pairs with relative separations >= 700 kpc.
4. Pairs isolated from massive neighboring structures: within a *3*d* radio, there cannot be objects with a mass > minimum mass of the pair.
5. Pairs with cut on relative radial velocity: *-120 km/s <vr<0 km/s*.

Datasets

1. Illustris-1
2. Illustris-TNG-75: 455, 910, 1820
3. Illustris-TNG-205: 625, 1250, 2500.

Periodic conditions

1. Periodic distance function.
2. Padding in all dimensions: replicate the simulation box.
3. Ignore galaxies at the edges.
4. Do not apply any padding.

Periodic conditions

Analyze the indices that were not preserved during the padding: most of them were at the edges -> the pair could have been disturbed by the replicated objects.

	Illustris-1			
	DM: Group_M_Crit200		SubhaloMassInRadType[4]	
	No padding	Padding	No padding	Padding
Original #	7713601	7713601	4366546	4366546
# after mass criterion	12875	12875	5828	5828
# pairs candidates	3819	3822	1675	1672
# pairs after thrsh distance	2981	2977	890	884
# pairs isolated	323	313	140	132
# pairs after vel criterion	257	248	99	93

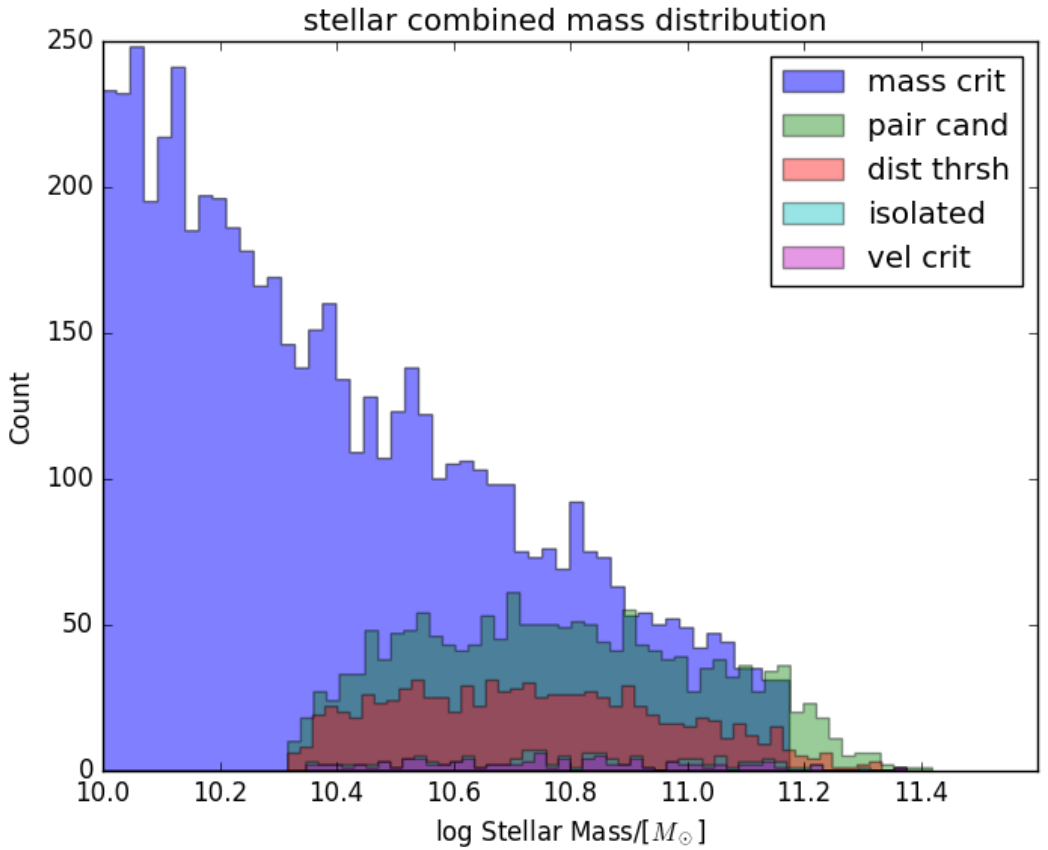
Periodic conditions

1. Periodic distance function.
2. Padding in all dimensions: replicate the simulation box.
3. Ignore galaxies at the edges.
4. Do not apply any padding.

Results: Illustris-1

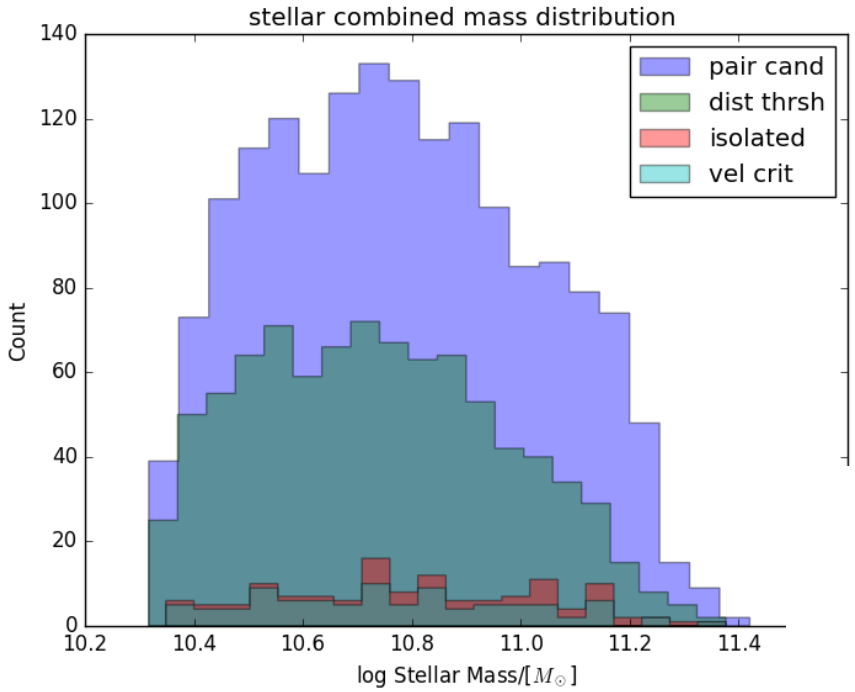
Cuts on stellar mass sample [1e10, 1.5e11]

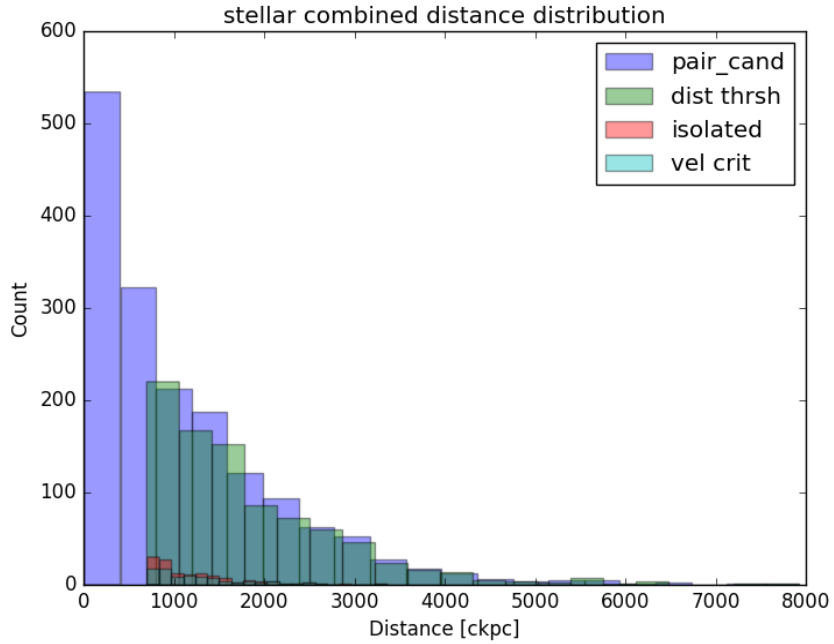
Overlapped mass distribution after applying each criterion:



Results: Illustris-1

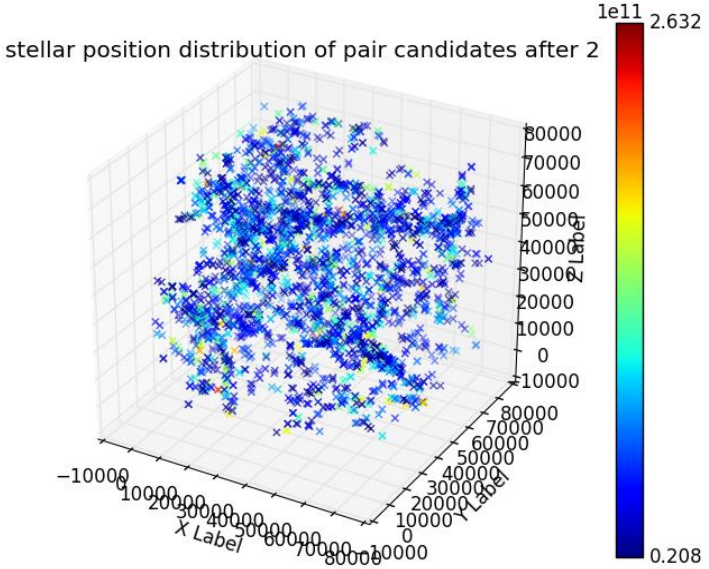
Cuts on stellar mass sample [1e10, 1.5e11]

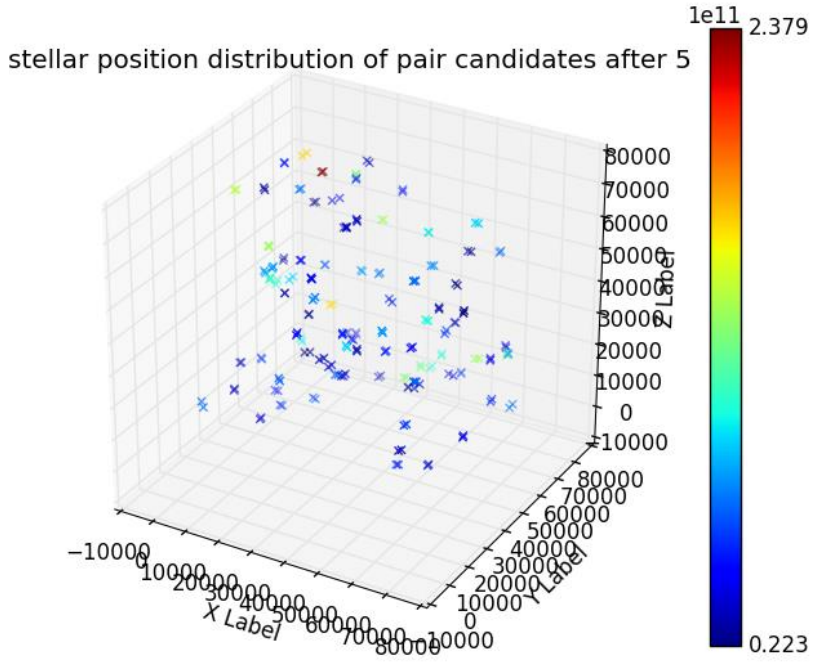




Results: Illustris-1

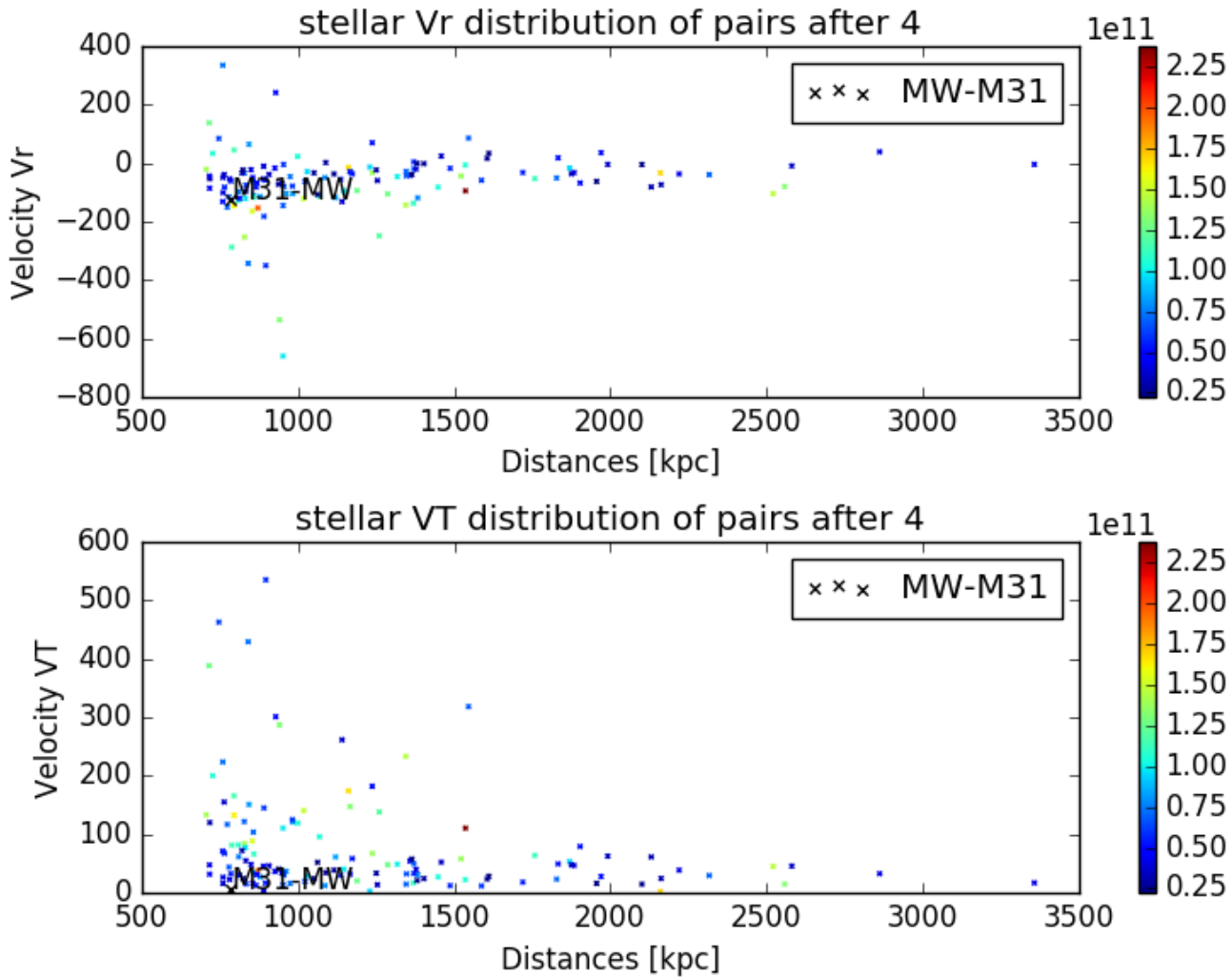
Cuts on stellar mass sample [1e10, 1.5e11]





Results: Illustris-1

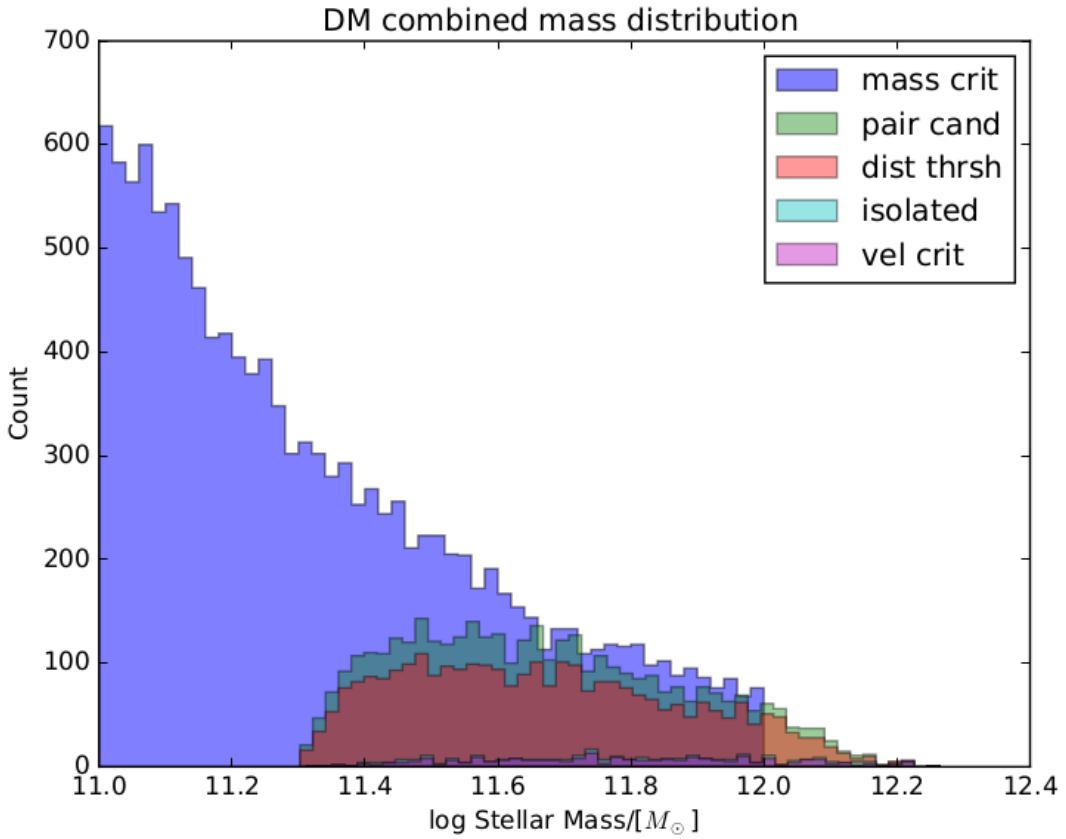
Cuts on stellar mass sample [1e10, 1.5e11]



Results: Illustris-1

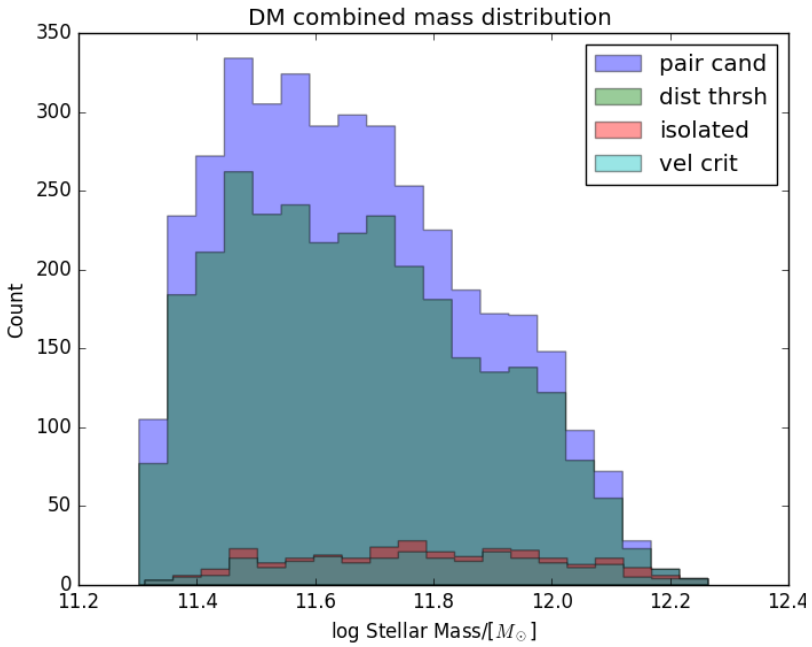
Cuts on DM halo mass sample [1e11, 1e12]

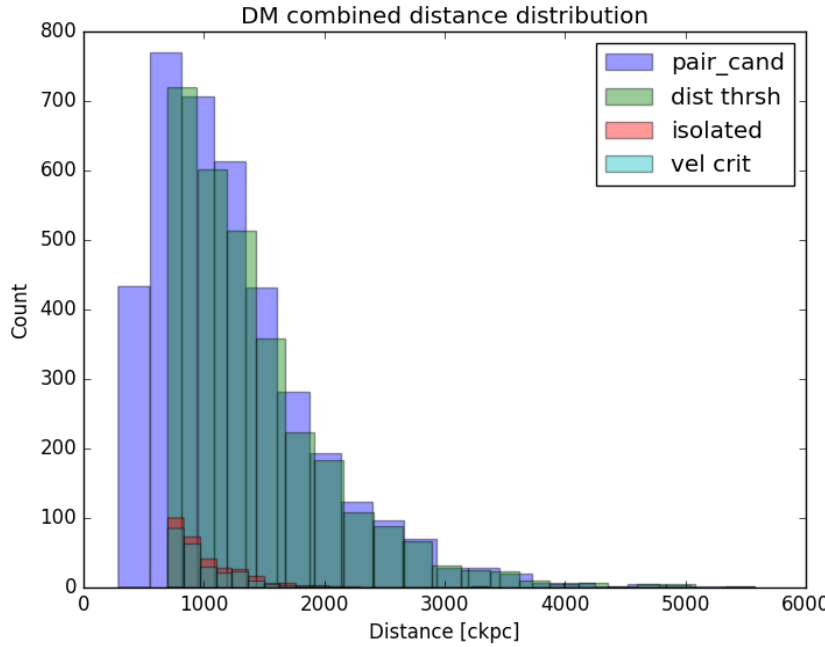
Overlapped mass distribution after applying each criterion:



Results: Illustris-1

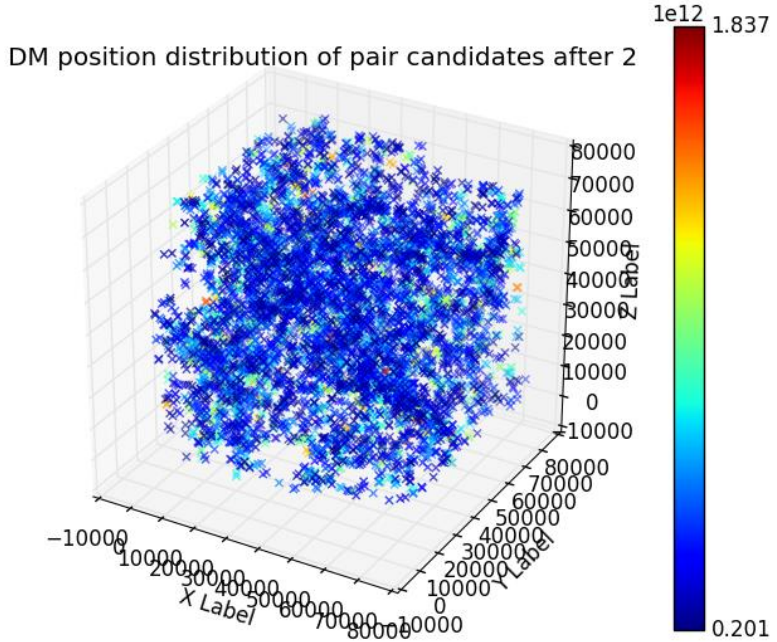
Cuts on DM halo mass sample [1e11, 1e12]

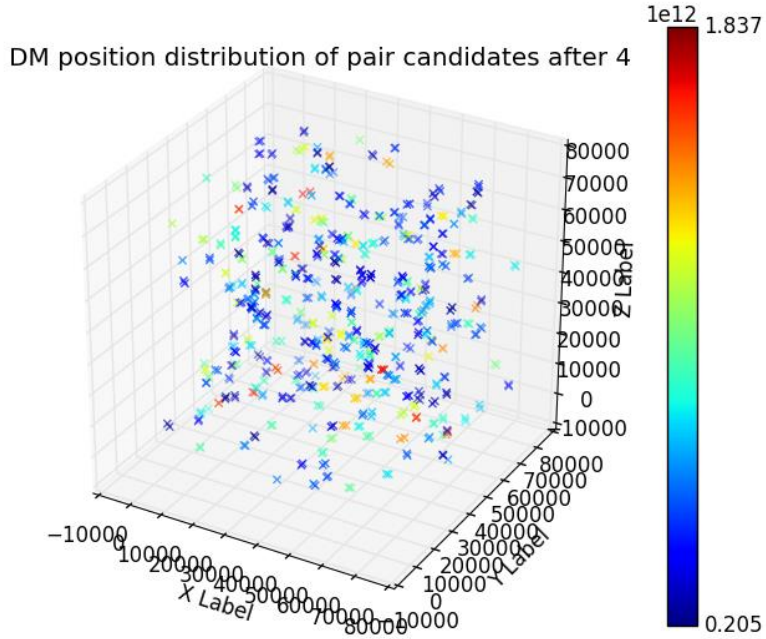




Results: Illustris-1

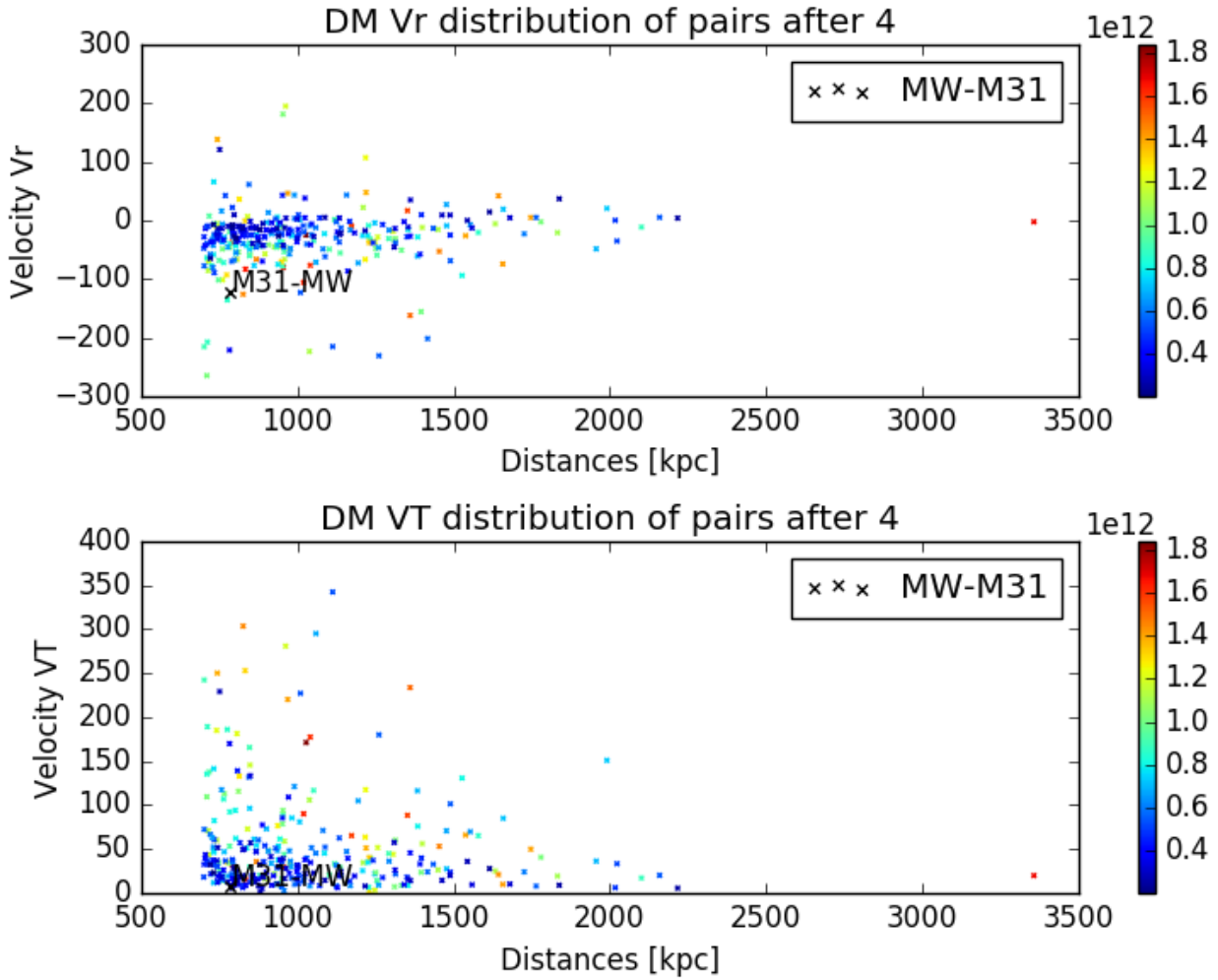
Cuts on DM halo mass sample [1e11, 1e12]





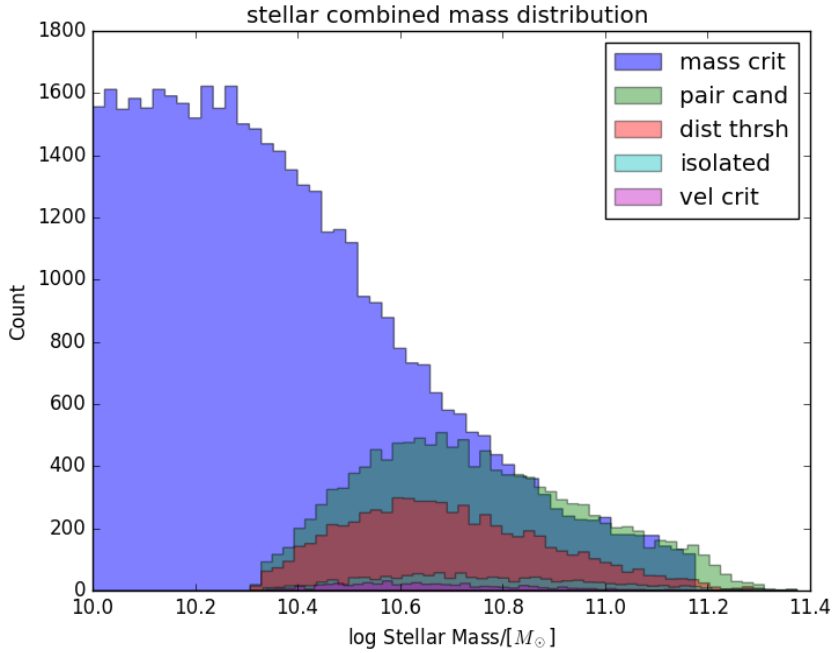
Results: Illustris-1

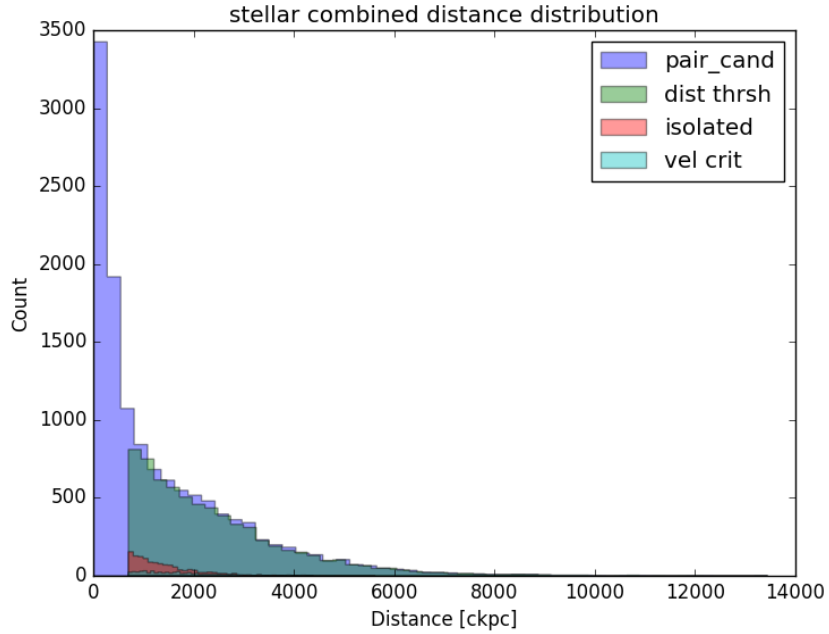
Cuts on DM halo mass sample [1e11, 1e12]



Results: TNG-300 L205n1250

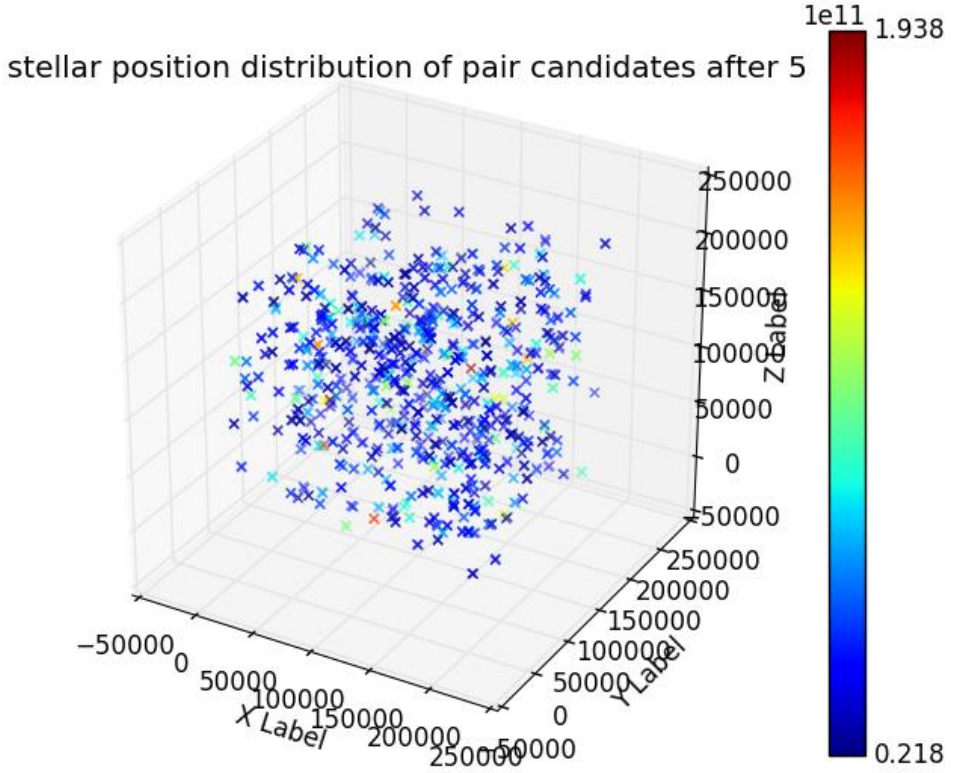
Cuts on stellar mass sample [1e10, 1.5e11]





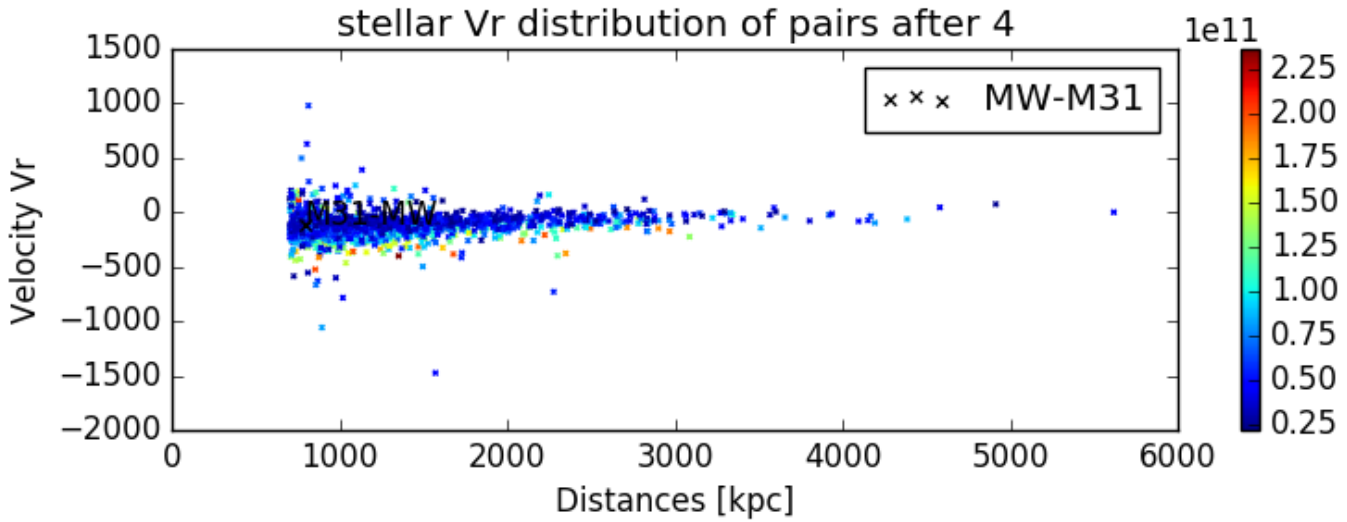
Results: TNG-300 L205n1250

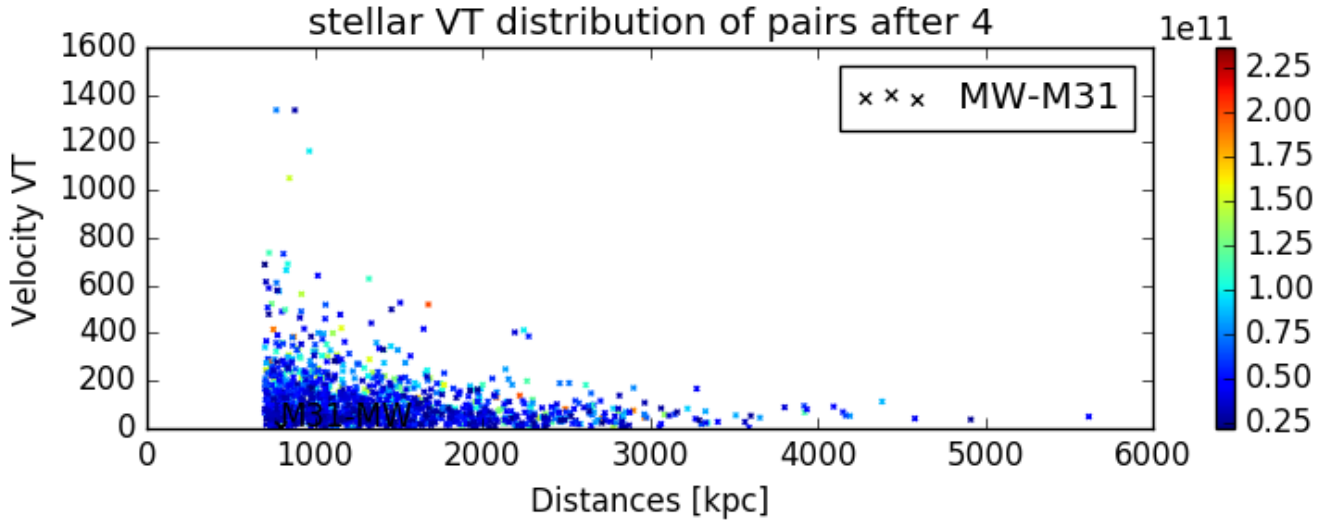
Cuts on stellar mass sample [1e10, 1.5e11]



Results: TNG-300 L205n1250

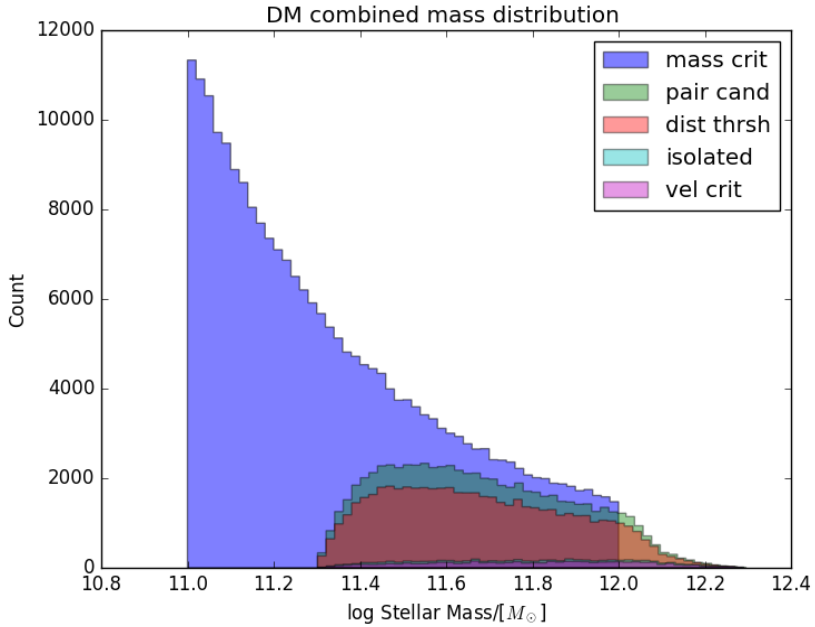
Cuts on stellar mass sample [1e10, 1.5e11]

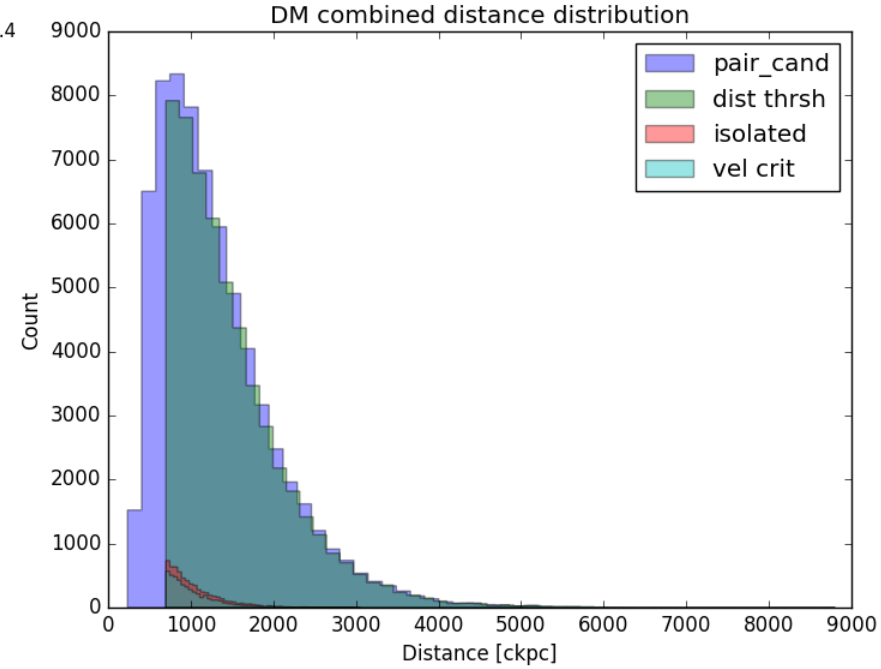




Results: TNG-300 L205n1250

Cuts on DM halo mass sample [1e11, 1e12]





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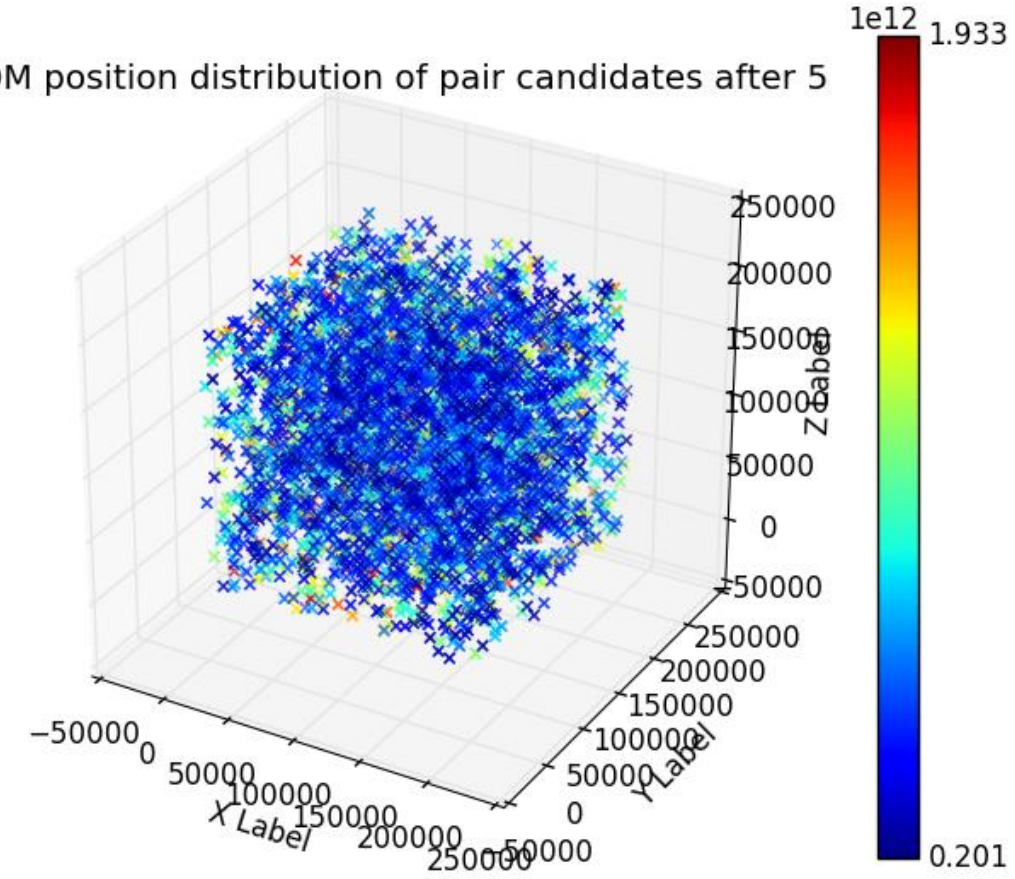

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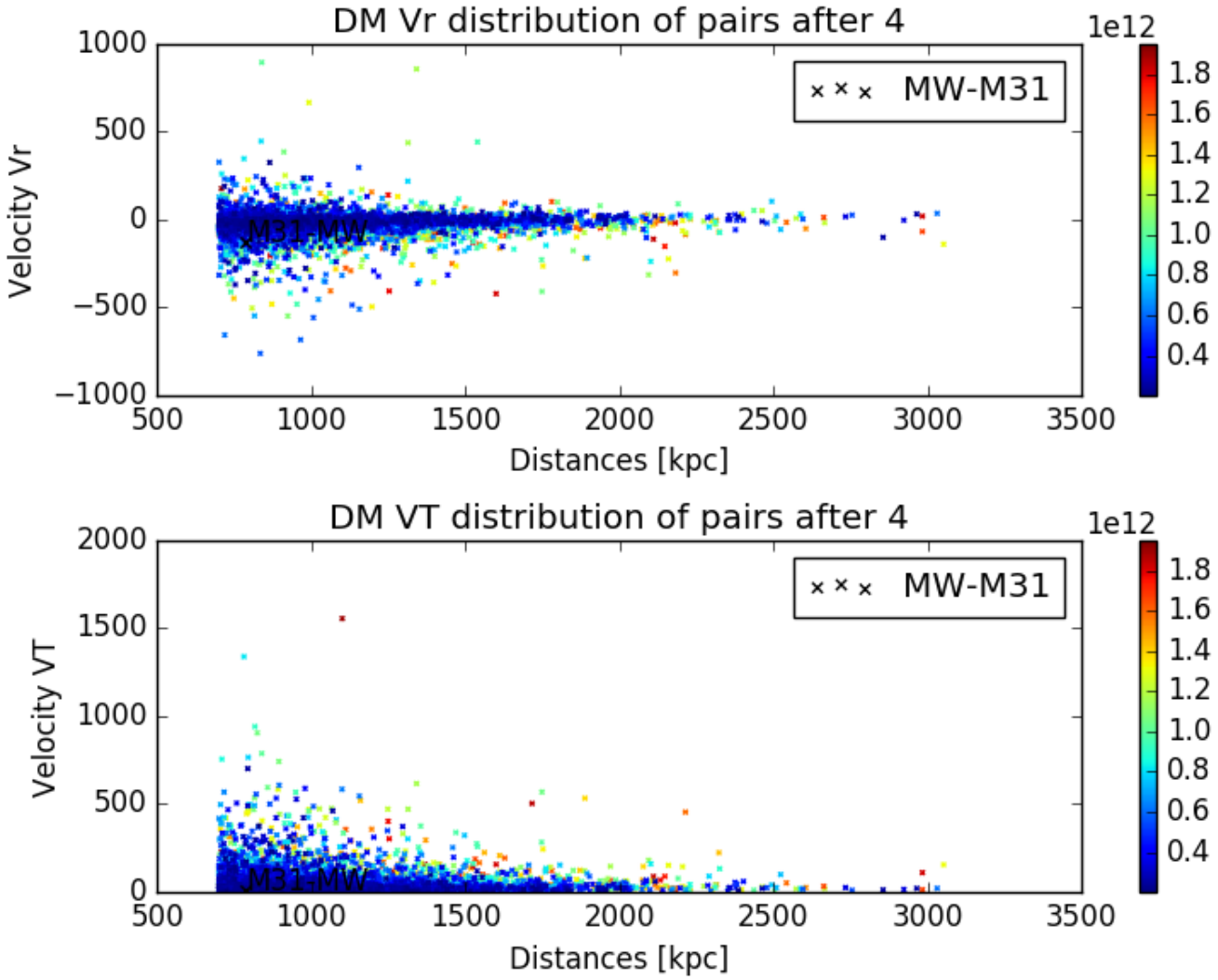
Cuts on DM halo mass sample [1e11, 1e12]



To review

- Define an upper bound for masses within the region of *3*d* around the pair candidate.
- Define an upper bound for the total mass of the pair.
- Why is it different the number of halo and subhalo particles?