Project Proposal

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1 Question:

For the project I would like to study the morphology of and evolution of the disks and tidal tails of the Milky Way and Andromeda Galaxies throughout their merger. Specifically, keeping track of how the material is affected by its initial location. Throughout the project I will be looking at the following questions:

1. How does the morphology of the disks change during the collision and how asymmetric is this change?
2. Which part of the disk do the tails come from? Are the tails made up mainly of outer disk material? Are they mainly from the leading edge of the galaxies? Does one galaxy give more material than the other to the tails?
3. How smooth are the tails in terms of mass distribution?

2 Methodology:

1. To observe asymmetry in the galaxies, I will choose time snap before the merger where the galaxies are about to collide but not significantly disturbed. In this time snap, I will divide the galaxy into N radially symmetric parts centered at the center of mass.

   - I will use this time snap to track the particles from each slice to look at where in the disk does the tails come from

   - Using the same process, I will continue the slicing of the galaxy disks during the merger to show the asymmetry of the galaxies. during the merger

2. I will also slice the galaxies into different ranges of distances from the center of mass.

   - I will use the slices to track how particles are pulled out into the tidal tails and where in the disks do the tails come from.

   - Look at where the stars are stolen from the other galaxy

3. In both methods, I will begin to treat all of the particles as part of one galaxy after 6.5 Gyr(determined as the point when the galaxies fully merged in previous homework).

4. To determine the matter stolen by the other galaxy, I will search for matter within a certain distance (30 kpc) of the other galaxies center of mass.

   - For matter that is not in the range of either galaxy, will be defined as being in the tails, with special definition for M33.

5. I will use the radial slices to separate tails from each other.