Astronomy 400-B project

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1   Research Project Topic

Proposal: The collision of Milky Way and Andromeda is heavily dependent on the initial conditions. Nevertheless, it is generally predicted by all models that the first close approach is expected to be in the next 3-5 Gyr and the collision is expected to occur in 10 Gyr. However, the velocity constraints on M31 (the tangential velocity) are not well-defined and depending on what velocity one uses, the dynamics of the collision change. For my project in this class, I could concentrate on any one of the following questions:

1. How do different velocity constraints effect the collision dynamics and properties of the two systems after the collision?

2. How does the collision effect the evolution of the supermassive black holes (SMBH) at the centers of the two galaxies?

The paper I am referring simulates the interaction via N-body integration, using the HiGPU code. Through the simulations, this paper investigates the dependence of the time of merger on the physical and dynamical properties of the system. Also, it studies the evolution of the two SMBH at the galactic centers of Milky Way and Andromeda.

2   References

1. Schiavi, R., Dolcetta, R. C., Sedda, M. A., & Spera, M. (2019, August 20). The collision between the Milky Way and Andromeda and the fate of their Supermassive Black Holes. Retrieved from https://arxiv.org/abs/1908.07278

2. Dolcetta, R. C., Spera, M., & Punzo, D. (2012, July 11). A fully parallel, high precision, N-body code running on hybrid computing platforms. Retrieved from https://arxiv.org/abs/1207.2367