

ABSTRACT

THESIS: Recreation of the Bullet Cluster (1E 0657-56) merging event via N-body computer simulation

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In this study I present two N-body computer simulations of the Bullet Cluster (1E 0657-56) merging system. The models are fully self-consistent, meaning that all gravitational forces are determined by the distribution of the particles. Initial positions and velocities of the two clusters are determined by solving a two-body problem. Post-collision time period shows an increase in the line-of-sight velocity dispersion in both clusters, and is consistent with previous Bullet Cluster studies. I also investigate the temporal evolution of the average cluster radial velocities of the galaxies located in the inner, middle, and outer regions of the clusters. I show that the orbital trajectories differ in pre- and post-collision periods. Inner region galaxies receive an impulse that moves them outward from the cluster center immediately after collision, while at the same time the outer region galaxies are pulled back towards the cluster center.