DARK MATTER INSIDE AND AROUND BINARY GALAXIES: FORMATION OF INTERACTING GALAXIES

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We study here the dynamics of an extended shell of relatively low-mass (almost zero-mass) particles around massive binary systems by computer simulations in the framework of approximately restricted three-body problem. We examine a set of several initial conditions concerning the masses M_1 and M_2 of the binary components surrounded by N test particles in uniform random distribution on a spherical envelope of radius R expanding with a velocity V. We apply this model to binary galaxy systems with a halo of baryonic dark matter, e.g., massive black holes. It is shown that, initially, the shell expands isotropically with decreasing velocity and then, falls back into the system forming zones of compressed matter. At some moment of time there could be a collapse of these particles on to the heavier component of the binary. Further in time, a number of particles escape from the system. We consider a number of different models with different initial parameters. For models with smaller R and V, about one-half of the particles escape from the system; while for larger values the shell disrupts as a whole. The escaping particles form a collimated flow in the plane of the orbit of the binary. The position of the flow and the directions of motions depend on the position of the heavier component of the binary at the moment of the closest approach of the particles and on the ratio M_1/M_2.

These results are described in more detail by Anosova and Anandarao (1994).

References

Anosova J., Anandarao B. 1994, Astrophys.Space Sci., in press