ORBITAL CHARACTERISTICS OF HIGH-VELOCITY STARS IN TWO GALACTIC MASS DISTRIBUTIONS.

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ABSTRACT

Orbits for 615 halo and high-velocity disk stars have been numerically integrated in two different models for the galactic mass distribution, both satisfying recent observational constraints for the rotation curve and the perpendicular force (Allen and Martos 1986, Allen and Santillán 1991). In spite of major differences in the mathematical form of both models for the galactic potential, the orbital parameters of most of the computed orbits do not change appreciably. The greatest differences are found in the apogalactic distances reached by weakly bound stars, in the heights above galactic plane, and most importantly, in the total fraction of chaotic as opposed to semiperiodic orbits found for each galactic potential model.

CONCLUSIONS

1. A large number of orbits computed in two very different galactic mass models show very similar characteristics. This result is reassuring because it shows that the orbital parameters of the stars under study, and the conclusions drawn from these, do not depend sensitively on the details of the galactic model used.

2. A given orbit may or may not be of the same type in both models. Even so, the similarity of the orbital parameters persists, except in the case of some chaotic orbits.

3. Using the newer mass model a larger fraction of chaotic orbits is obtained (50% as opposed to 36%). This result is interpreted as being due to the fact that a larger volume of the central part of the galaxy is dominated by the spherical mass distribution.

REFERENCES

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