42.14

Phase Mixing in Galactic Collapse

L. Feinswig, G. Lake (U. Wash)

Hierarchical models for galaxy formation propose that the collapse will involve the disruption of lumps roughly the size of dwarf galaxies. We model the evolution of these lumps in the mean field of the galaxy over a Hubble time by solving for the orbits using action-angle variables. The potential is a modified isochrone which allows for non-axisymmetry and flattening. This potential is a reasonable estimate of the Galactic potential over radii of interest, although it leads to a slight overestimate of the mixing. Between 3-30 dynamical times are needed to mix the clouds depending on their initial velocity dispersion, so the material with the largest apogalactic mix moves most slowly. As expected, material accumulates at the points where the radial velocity vanishes, either due to the low absolute velocity at apogalacticon, or the narrow distribution in radius at perigalacticon.

We use our results to evaluate prospects for cold dark matter detection. The first generation of detectors will be sensitive only to particles with velocities \( \gtrsim 500 \text{ km s}^{-1} \). As these particles must have large apogalactic radii to reach high velocities locally, they are not well mixed. In the optimum situation with the earth inside a coherent stripe, the flux can be orders of magnitude higher than expected. Additionally, this bunching of material makes an axion field more coherent and easier to detect. If the dark matter is WIMP's their annihilation rates will be enhanced at the overdensities, making their gamma ray signal more prominent.

42.15

An Experimental Study of Counter-Rotating Cores in Elliptical Galaxies

B.F. Smith (NASA/Ames), R.H. Miller and G.R. Roelofs (U. Chicago)

Recent observational studies have shown that some elliptical galaxies have cores which rotate in the opposite direction as the outer parts of the galaxy. A few others have cores that rotate rapidly in the same direction. Either way, the core acts like a dynamical subsystem that is distinct from the rest of the galaxy. The dynamical significance of these observations is being investigated in a series of numerical experiments with a core embedded in an axially symmetric elliptical galaxy. Results for a set of different orientations of the core rotation axis will be discussed. A core is stable if its rotation axis is parallel or anti-parallel to the symmetry axis of the galaxy. For intermediate cases the component of rotation perpendicular to the galaxy's symmetry axis is damped. Is is damped more strongly for more strongly flattened galaxies. Rapidly rotating cores will be discussed by this process, whatever their orientation, if the galaxy is triaxial. The numerical experiments place constraints on the combination of the degree of anisotropy in the potential of the elliptical galaxy and the lifetime of the core in the sense that a core cannot survive as long in a strongly anisotropic potential.

43.02

Computer Based Undergraduate Labs

J.D. Trasco, M.F. A'Hearn, R.A. Bell (U. Maryland)

There has been a project underway for several years to develop computer based lab exercises to be used for undergraduate non-science major courses. The relevant lab course at the University of Maryland has an enrollment of 450 per semester. A significant problem with this course has been to develop exercises which can be completed (preferably with the write up also done) in a short time period (2 hours). At the same time one wishes to aim for interesting work which will have some significant learning experience. Clearly, this is an ambitious agenda which has only been begun. The original concept was to use the computer to simulate telescope observations. This has evolved in the course of time so that the computer on occasions effectively does partial data reductions as well as "making observations". Four lab exercises have been developed and all will have been used in the class by the end of the semester. The subjects include "Jupiter's Moons", "Parallax", "Galactic Rotation" and "Expansion of the Universe". All the labs have been developed for use on IBM equipment. Current results will be demonstrated at the meeting. This work has been a collaborative effort of several persons in the Astronomy Program of the University of Maryland. Particular mention should be made of work done by G. Beam and J.T. Ohmacher. We have received substantial support from the Instructional Computing Program at the University. Equipment has been provided by a grant from IBM to the University of Maryland.

43.03

ASTRONOMY FOR SPECIAL PEOPLE:
THE VISUALLY IMPAIRED

N. Grice (Charles Hayden Planetarium/ Boston Museum of Science)

Astronomy education for the visually impaired can be greatly enhanced through the use of tactile or raised illustrations. What sighted persons can see, visually impaired persons can feel.

Although braille maps are used in some school systems, the lack of astronomy