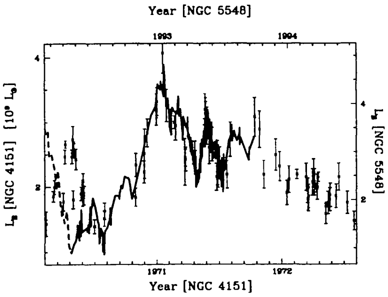
(error bars) in the beginning of the 70's to that of NGC 5548 twenty two years later (dashed and solid lines). The basic temporal structure of these 'pulses' consists of a short, weak flare followed by a ~ 2 years long powerful burst which shows a global decay with $\sim$ month-scale oscillations superposed. The total B-band energy involved in each pulse is $\sim 3 \times 10^{50}$ erg. There are at least 5 occurrences of such a pattern in the data.

These coincidences suggest the existence of a fundamental 'unit' of variability in active galaxies. Luminous AGN would then be made up of a random superposition of such pulses. In fact, pulse energies and time-scales derived from QSO light curves are consistent with those found in these two Seyfert 1's. Before exploring this possibility, it is worth waiting for the release of the 1994–1995 data for NGC 5548, which should allow a strong test of the existence of the pattern discussed here.



DYNAMICAL FRICTION IN STELLAR SYSTEMS

S.A. Cora[1], J.C. Muzzio[1], and M.M. Vergne[1]

We performed numerical experiments to analyze the deceleration suffered by a rigid extended satellite passing through a larger spherical stellar system due to dynamical friction effects. We considered galaxies of 5000 and 10000 particles with isotropic velocity distribution. Both the galaxies and the satellites were represented by Plummer spheres ($\rho \propto r^{-5}$). The satellites have masses of 1, 4 and 9% of the galaxy mass and move along elongated orbits. An analytical estimate of the deceleration of the satellite was obtained by the straightforward application of Chandrasekhar's dynamical friction formula. We first integrated the equations of motion in a fully self consistent way using the program N-BODY2 (Aarseth's code). We compared the numerical and theoretical values of the relative energy of the satellite with respect to the galaxy; the best possible fits depend on the satellite masses. We found very good agreement between the numerical results and the theoretical predictions, so the orbital decay can be well described by Chandrasekhar's formula, which suggests that this can be characterized as a local process. These conclusions were not altered by the use of a non-self consistent code, which indicates that the self consistency of the galaxy does not affect the orbital decay of the satellite.

To check the effect of the global response of the galaxy on the orbital decay, we run two more sets of simulations with two and four satellites, respectively, which are diametrically opposed and do not interact with each other. The self consistency of the galaxy was neglected. The different decay rates of the satellite (progressively slower for the models with more satellites) indicate that the different global responses induced in each set of models affect, but only sligthly, the orbital decay of the satellite due to dynamical friction.

Other simulations, in which the galaxies have anisotropic velocity distribution given by the Osipkov-Merrit models, indicate that this does not affect the orbital decay of the satellite.

[1]Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, Argentina

---

STATISTICAL PROPERTIES OF INTEGRATED SPECTRA OF GALAXIES

Héctor Cuevas[1] and Laerte Sodré Jr.[1]

We have studied the sample of 55 integrated spectra from Kennicutt's (1992) spectrophotometric atlas of galaxies. The data was divided in two sets, one containing only normal galaxies (23 objects) and the other with all galaxies. The Karhunen-Loeve Transform (KLT) was then applied to the covariance matrix of the data. We show that the first two terms of the KLT explain 95.7% of the variance of the normal galaxies set, and 83.2% of the all-galaxies set. The projection of the spectra over the plane spanned by the first two terms of the KLT shows that in both sets the normal galaxies are in a linear sequence which we call *spectral sequence.* We show that the spectral sequence is closely related to the Hubble morphological sequence. This result suggests that a single parameter is responsible for the spectral sequence. Using the models of Bruzual & Charlot (1993), we show that this sequence can be parametrized by a time-scale of star formation characteristic of each morphological type. Our results are robust in the sense that the reality of the spectral sequence does not depend on the data normalization.

[1]Instituto Astronômico e Geofísico, Universidade de São Paulo, Brazil