1992; MacKenty et al. 1994). **Radio-jet galaxies** (e.g., Colina & Pérez-Fournon 1990*a,b*; de Juan et al., 1993; Colina & de Juan 1995; Colina & Borne 1995). **Powerful Radio Galaxies** (e.g., Heckman et al. 1986; Smith & Heckman 1989*a,b*, 1990*b*; cf., Smith & Heckman 1990*a*). **Low-luminosity Radio Galaxies** (e.g., de Juan et al., 1994). **GHz-peaked-spectrum Radio Galaxies** (Stranghellini et al. 1993). **Actively Star-forming Galaxies** (= Starbursts; e.g., Joseph & Wright 1985; Bushouse 1986; Kennicutt et al. 1987; Kennicutt 1990; Smith & Kassim 1993; Keel 1993; Smith et al. 1995; Borne et al. 1995, 1996*b*). **IR-luminous Galaxies** (e.g., Sanders et al. 1988*a,b*; Lawrence et al. 1989; Armus 1989; Melnick & Mirabel 1990; Carico et al. 1990; Hutchings & Neff 1991, 1992*a*; Majewski et al. 1993; Gallimore & Keel 1993; Leech et al. 1994; Liu & Kennicutt 1995*a,b*; Borne et al. 1996*c*). **Galaxies with Centrally Concentrated Molecular Gas** (e.g., Sargent & Scoville 1991; Scoville et al. 1991).

b) Theoretical Studies:

Noguchi & Ishibashi (1986); Byrd et al. (1986, 1987); Lin, Pringle, & Rees (1988); Noguchi (1988*a,b*, 1991, 1992); Hernquist (1989); Olson & Kwan (1990*a,b*); Barnes & Hernquist (1991); Mihos, Richstone, & Bothun (1991, 1992); Wada & Habe (1992); Hernquist & Weil (1992); W. & H. (1993); Mihos, Bothun, & Richstone (1993); Borne & Colina (1993); Bekki & Noguchi (1994); Bekki (1995); Heller & Shlosman (1994); Lamb, Gerber, & Balsara (1994); Mihos & Hernquist (1994*a,c,d,e*, 1996); Hernquist & Mihos (1995).

The numerical models used in these studies are now quite impressive in both power and realism. They are increasingly rich in physics (dynamical, hydrodynamical, and chemical). Such studies are consequently helping to answer in a positive way one of the fundamental questions that has arisen from the wealthy accumulations of observations on active galaxies: *Is activity in galaxies actually triggered by tidal interactions?*

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MARGINALLY BOUND COLLISIONS LEADING TO STARBURST ACTIVITY

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A previous study (Chatterjee 1996) of the effect of collision between a spiral, with high gasous content, and an equally massive compact elliptical, under marginally bound conditions, indicated the formation of an oval distortion in the disk of the spiral at the closest approach, which influences the motion of gas in the outer region of the disk, leading to mild activation. We have studied the subsequent orbital evolution of the elliptical. After the first grazing pericentric passage, the return of the perturber is characterized by a shrinking of the orbit and disk penetration, causing the activity to be strongly enhanced due to the reduced dynamical timescale. We find that the activity induced in the initial encounter is very mild; only in the second (return) encounter the activity is substantiated to be detectable easily. However, if we take the mild enhancement in star formation, due to the initial encounter, into account, then a slight enhancement of star formation indicators will be expected in many spirals. We find that the perturber is not in the vicinity of the spiral when the enhancement in star formation takes place, since the marginally bound orbit is of enormous proportions; such that many of these galaxies with a marginal enhancement in star formation will appear to be isolated; however, they will be in physically wide pairing with a distant companion. In this context, Chengalur et al. 1996, find evidence of very wide physically bound pairs; these pairs should be examined for mild enhancement in star formation indicators.

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DWARF GALAXIES AROUND ULTRALUMINOUS *IRAS* GALAXIES

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The evolutionary sequence leading to massive star formation events in some galaxies is one of the most puzzling questions in astronomy. The mergers of gas-rich galaxies drive new supply of fuel deep into a galaxy and have been proposed as one source of en-

hanced star formation. Angular momentum conservation may cause the ejection of significant amounts of synthesized material from stellar evolution into intergalactic space. This gas may form tails of stellar clusters and dwarf galaxies and we test this scenario by a search for small gas ejecta around a sample of ultraluminous infrared galaxies with compact nuclear starbursts. About 15 galaxies were selected from the *IRAS* bright galaxy sample and from Condon et al. (1991). We also selected were several regular spirals nearby the *IRAS* galaxies as 'control galaxies'. Wide-field (prime-focus) images were taken at the 2.5-m INT on La Palma in V and R band. We have analyzed NGC 3226, NGC 2623 and NGC 520, and made lists of small but extended, nonstellar objects (NSOs) around each central galaxy. The objects have been photometrically calibrated, with a precision of about 0.1 mag and are complete to about 20 mag. Only a few of them have been previously cataloged. We also made histograms of the surface density of the NSOs as a function of the distance from the central galaxy's center. For the frames with multicolor observations, statistics of the colors of the NSOs can be obtained. There is no evidence in this preliminary analysis for a concentration of NSOs close to the parent galaxy. There are some apparent concentrations of NSOs in regions near interaction zones of the central galaxy. In a string of objects extending from the tail of NGC 2623, the NSOs have bluer colors then in the average. In the case of NGC 520, the density of NSOs anticorellates with the H I column density in the tail extending to the companion UGC 00957.

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3-DIMENSIONAL MHD MODELLING OF JETS: STABILITY AND COLLIMATION

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Highly collimated, supersonic, magnetized jets are common in Active Galactic Nuclei. We investigate the stability of magnetized jets via 3D simulations using the Smoothed Particle Hydrodynamics technique (e.g., Gouveia Dal Pino & Benz 1993, 1994; Chernin et al. 1994; Gouveia Dal Pino 1995; Gouveia Dal Pino et al. 1996; Gouveia Dal Pino & Birkinshaw 1996), which has been modified to incorporate the effects of magnetic fields (e.g., Gouveia Dal Pino & Cerqueira 1996). Jet collimation, cushioning on the shocks at the jet head, and internal knot formation due to the presence of magnetic fields (B) are investigated in both, adiabatic and radiative jets. Two initial magnetic field geometries are considered: i) a uniform longitudinal B-field in the jet and environment, and ii) a helical B-field. Compared with pure hydrodynamical cases, the presence of a B-field increases the beam collimation and, in general, reduces the density enhancement at the bow shock in the head. Helical geometries promote some pinching along the beam, which may explain the formation of internal knots in a few dynamical times. The latter effect is, however, inhibited by the presence of radiative cooling. Kink helical instabilities develop mainly close to the jet head in both B-geometries, which tend to break the jet axis-symmetry.

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OPTICAL VARIABILITY OF QSOs: THE STARBURST, ACCRETION DISK AND MICROLENSING PARADIGMS

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The long-term variability of a large, statistically well defined sample of optically selected QSOs has been studied. The variability-luminosity and variability-redshift correlations, and the wavelength dependence of the variability have been investigated by means of "robust" statistical estimators that allow to eliminate the influence of the measurement errors. The analysis of the ensemble structure function and the individual variability indices in the QSOs rest frame show that: 1) A negative correlation between variability and luminosity is clearly present (more luminous QSOs show less variability). 2) A positive correlation exists between variability and redshift. Such correlations may be parameterized either with a model in which the timescale of the variability is fixed for all the QSOs and the amplitude linearly increases with the absolute magnitude and redshift, or with a model in which the timescale of the variability linearly depends on the absolute magnitude and the amplitude is only a function of the redshift. 3) The amplitude of the R-band variability is smaller