33.17
Effects of Source Geometry on Continuum Radiation Transport

G. F. Spagna, Jr. , C. M. Leung (RPI)

We present numerical solutions to the equations of radiation transport for a dusty medium of different source geometries (under the assumptions of gray opacity and radiation equilibrium). Both one-dimensional (1-D) and two-dimensional (2-D) geometries are considered. The 1-D cases of planar, spherical, and cylindrical symmetry are compared to the 2-D case of disk geometry. Models are constructed using 1-D and 2-D codes to study the effects of varying source geometry and optical depth on the radiation field and on the thermal structure of the medium. Particular attention is paid to the behavior of the spatial and angular distribution of the emergent intensity. By comparing results from the 1-D and 2-D codes, we examine the conditions under which simpler, 1-D models for planar, spherical, and cylindrical geometries can serve as useful approximations to the more complex, 2-D model for disk geometry. Implications for the interpretation of continuum infrared observations will be discussed.

This research is partially supported by NASA Grant No. NAGW-577.

34.02
X-ray Observations of the Mass Distribution in the Cluster of Galaxies A754

D. Fabricant, P. Gorenstein (Harvard-Smithsonian Center for Astrophysics), T. Beers (California Institute of Technology), M. Kurtz and M. Geller (Center for Astrophysics)

A754, an optically rich cluster, is also a very luminous (~6 x 10^{44} ergs s^{-1}) X-ray emitter. Optical observations have suggested that the galaxy distribution is flattened, with the majority of galaxies probably concentrated in two clumps. This interpretation is supported by the distribution of the X-ray emitting gas, which also indicates a highly flattened structure. We describe the cluster mass distribution obtained from the X-ray data by two techniques: model fitting and a more direct deconvolution technique.

34.03
Redshifts of Emission Line Galaxies Near the Bootes Void

S. A. Gregory (Bowling Green U. and U. of New Mexico), W. G. Tifft (U. of Arizona), R. P. Kirshner and J. W. Moody (U. of Michigan)

New redshifts are reported for 40 objects in the list of Sanduleak and Pesch. The original survey was made as a probe of the Bootes void, but it lies too near the edge to be a conclusive study of many properties of the void. The most important result of the new redshifts is to demonstrate that the large-scale distribution of galaxies chosen by emission line properties coincides with that of magnitude limited samples.

Session 34: Galaxy Clusters; Relativity
9:40–5:30 (Coconino Room, Convention Center)
(Display Session)

34.01
The Nature of Radio Sources in Compact Groups of Galaxies

T.K. Menon, P. Hickson (U. of B.C.)

We have surveyed all 88 compact groups north of -20° in Hickson's (Ap.J. 255, 382, 1982) catalog with the VLA to a flux limit of 1.5 mJy at 20 cm. Sources were found and confirmed by high resolution observations in 48 of the 405 member galaxies. All sources with one exception are single and for most non-spiral galaxies are coincident with the optical nucleus with a dispersion of about 1.4 arcsec. The dispersion for spiral galaxies is about 4 arcsec.

Sources in elliptical galaxies occur almost exclusively in the first-ranked group member while spirals show no significant preference with optical luminosity. For comparison, only 24% of all ellipticals are first-ranked.

The detected elliptical galaxies show a strong correlation between radio and optical luminosity while the spirals have a narrow range in radio luminosity.

The mean surface brightness of groups containing radio sources is higher than average but only at a 3% significance level. It is likely that local galaxy density plays a role in determining radio activity, but is not of primary importance.

We conclude that the triggering process for activity in ellipticals in these groups is different from that of spirals. It is suggested that the dominant process may be accretion onto the nucleus in the first case and interaction in the second. Additional observations in the VLA A configuration at 20 and 6 cm are being obtained in order to study the structure of these sources in greater detail.

34.04
HI in NGC 7241: Evidence for a Hidden Companion

R. Giovanelli and M.P. Haynes (NAIC)

HI observations of the field which include NGC 7241 and UGC 11964 obtained with the Arecibo 305m telescope have revealed the presence of a large cloud, partially superimposed on NGC 7241 and extending several galactic radii to the southeast of that galaxy. The cloud's emission is characterized by a column density larger than 20 x 10^{19} cm^{-2} and a velocity width smaller than 50 km/s; its HI mass is about 7 x 10^{8} $M_\odot$ (for H_o = 50). NGC 7241 itself is a moderately bright (m=+13.8) S-Irr galaxy of angular size (UGC) 3'.5 x 0'.8; its HI mass is ten times greater than that of the cloud 7 x 10^{9} $M_\odot$. The companion UGC 11964 is classified as Sc and is smaller (2'.1 x 0'.2) and fainter (m=+16.0), with a HI mass comparable to that of the cloud. The two galaxies have heliocentric radial velocities of +1445 km/s (NGC 7241) and +1426 km/s (UGC 11964). The observations cannot be reconciled by an interpretation involving a close, tidal, disruptive encounter of NGC 7241 and UGC 11964; alternative hypotheses may be either (a) that the gas is a "fetal" remnant of the material from which the galaxies in the group formed, or (b) that it resulted from the interaction of NGC 7241 with a galactic system optically unidentified. Higher resolution observations made with the VLA illustrate in detail the structural and dynamical characteristics of the gaseous material, and reveal evidence for the existence of an optically hidden companion lying along the line of sight to, and possibly behind, NGC 7241. This third galaxy may account for morphological peculiarities visible in the optical image of NGC 7241. The tidal interaction of these two could produce the extended gas distribution far outside the optical disks, thus reducing the origin of the phenomenon to a well understood, relatively common occurrence.