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A New Limit on the Luminosity of the Halo of NGC4565 from Infrared Observations

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Abstracts of Papers Presented
(Numbers preceding abstract titles
indicate session and sequence of
presentation)

29 JUNE 1981

MONDAY MORNING

Invited Paper: 0915-1015 (MacEwan Hall)

01.00 The Age and Size of the Universe,
 S. van den BERGH, DAO

Session 1: 1030-1200 (A201)
Galaxies

01.01 A New Limit on the Luminosity of
the Halo of NGC4565 from Infrared Observations,
 P.R. SAULSON, S.P. BOUGHN, M. SELDNER,
Princeton Univ. We measured the K-band (2.2
 micron) brightness of the spheroidal component
 of the spiral galaxy NGC4565, using the InSb
 system at the 1.3 meter telescope of KPNO.
 Comparing the K-band brightness profile of the
 minor axis with published profiles in visible
 bands fails to reveal excess infrared lumin-
 osity toward larger galactocentric radii, such
 as would be expected if the galaxy were sur-
 rounded by a massive halo made of late-type
 main sequence stars. Upper limits on the
 excess brightness, coupled with the mass esti-
 mate implied by the published rotation curve,
 implies that the mass-to-light ratio of the
 halo material is larger than that of the
 faintest main sequence stars known. This
 research was supported in part by the National
 Science Foundation.

01.02 Discovery of a Carbon Star in the
Draco Dwarf Spheroidal Galaxy, M. Aaronson, J.
 Liebert, J. Stocke, Steward Obs., Univ. of Ari-
zona - A IV-N grism survey has led to the dis-
 covery of one (and only one) carbon star in
 Draco. Optical photometry places the star at the

tip of the Draco giant branch, and the measured
 velocity of -300 km/s is in agreement with the
 previously determined Draco redshift; hence,
 membership of the star seems unquestionable.
 The star is unique among known carbon stars in
 other dwarf spheroidals in possessing a Balmer
 emission line spectrum, with unusually strong
 H alpha; He II 4686 is also present. Preliminary
 infrared photometry yields $M_{bol} = -3.5$ mag, and
 a warm effective temperature (about 4000 K).
 In the HR diagram the star thus falls near the
 giant branch tips of metal-poor galactic globu-
 lars, and in this respect is similar to the low
 luminosity carbon stars found in Sculptor and
 Carina. The theoretical core mass - luminosity
 relation places an upper limit on the star's
 age comparable to galactic globulars. Neverthe-
 less, by analogy with the intermediate-age
 systems in the Magellanic Clouds, the presence
 of a carbon star in Draco suggests that an
 extended period of star formation occurred
 there. This provides a natural explanation for
 the spread in metallicity seen on the Draco
 giant branch, via chemical enrichment through
 successive generations of stars.

This work was partially supported with
 funds from the National Science Foundation.

01.03 Simulations of Clusters of
Galaxies. E. M. MALUMUTH and
 D. O. RICHSTONE, University of Michigan. --
 The dynamical evolution of a cluster of
 galaxies after virialization is investigated
 by means of numerical simulations. Orbits
 chosen from a King model are followed under
 the influence of the cluster potential. The
 effects of dynamical friction, mergers and
 tidal stripping are calculated. About 10
 simulations were conducted with different
 statistical realizations of the same initial
 cluster parameters. Each simulation produces
 an object more massive than any of the
 original galaxies, located near the cluster
 center. The mass of the most massive galaxy
 varies by a factor of 3 from model to model.
 During the simulation, considerable debris is
 released in the cluster, and the distribution
 of the brighter galaxies becomes more
 centrally condensed. Despite the fact that
 many galaxies suffer large mass changes, an
 initial mass function resembling Schechter's
 (1976 Ap.J. 203, 297) does not evolve
 catastrophically. These simulations produce
 models which resemble cD and spiral poor
 clusters in many respects.