The Nuclear Regions of NGC 3311 and NGC 7768 Imaged with the HST
Planetary Camera

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We present high-resolution, V-band images of the central regions of the
brightest cluster ellipticals NGC 3311 and NGC 7768 taken with the Planetary
Camera of the Hubble Space Telescope. The nuclei of both galaxies are found
to be obscured by dust, though the morphology of the dust is quite different in
the two cases. The dust cloud which obscures the central 3 arcseconds of NGC
3311 is complex and irregular, while the central region of NGC 7768 contains
a disk of material similar in appearance and scale to that recently observed
in HST images of NGC 4261. The bright, relatively blue source detected in
ground-based studies of NGC 3311 is marginally resolved and is likely to be a
site of ongoing star formation. We examine the distribution of globular clusters
in the central regions of NGC 3311. The gradient in the surface density profile
of the cluster system is significantly shallower than that found by previous
investigators at larger radii. We find a core radius for the cluster distribution of
32 ± 8 arcsec. This is five times larger than the upper limit on the core radius
of the stellar light and suggests that the central field-star population and the
globular cluster system are dynamically distinct.

Dynamics of Polar Rings in Oblate and Triaxial Potentials

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A number of early type galaxies show a polar ring of gas, dust and stars lying
roughly perpendicular to the apparent major axis of the central galaxy. We have
studied the dynamics of a self-gravitating ring which is inclined to the principal
planes of a triaxial galactic potential tumbling about its short axis; in a steadily-
precessing equilibrium state, the precession rate of the ring in the potential must
be equal to the tumbling speed of the triaxial figure. As in an oblate galaxy, both
stable and unstable equilibria exist: in the tumbling triaxial potential, there are
stable equilibria bending towards the equator, if the ring is light, and towards
the pole, at higher ring mass. The former are similar to the 'anomalous retrograde
orbits', while the latter resemble the stable equilibria for a self-gravitating ring in
an oblate potential. Following the time evolution of unstable polar rings shows
that in an oblate galaxy potential, even if the ring is not sufficiently massive to
be stabilised, self-gravity can still cause the characteristic warp up towards the
pole. In the triaxial potential, when the inclination of the polar ring is not such
that its precession rate matches the galaxy tumbling speed, the ring can wobble
gently in a quasi-periodic manner if it is massive enough, but is disrupted if its
mass is too low.

Some polar rings are not mirror-symmetric about the center of the galaxy, but
have a banana or 'C' shaped bend: these distortions may represent asymmetri-
cal bending modes. The sideways displacement of an isolated ring or disk represents
a neutrally stable mode of zero frequency; in the central galaxy potential, this
can become an m=0 bending mode, which remains discrete when the galaxy is
not too massive in relation to the ring. The curvature of the mode is sensitive
to the core radius of the galaxy halo. The mode is not spontaneously unstable,
so the bending must be excited by an encounter, or during the accretion of ring
material.

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A Four-Image Gravitational Lens in MG0751+2716

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We report the discovery of a new four-image gravitational lens in the radio
source MG0751+2716.

Gravitational lensing occurs when the light from a distant source is deflected
by the mass of an intervening lens. Since the gravitational deflection traces the
total mass of the lens, gravitational lenses can be used to probe the dark matter
distribution in galaxies. This approach can provide an important confirmation
of dynamical mass profile determinations, and the lensing galaxies are typically
at very great distances (z ~ 1).

MG0751+2716 was discovered as part of the MIT-Greenbank-VLA search for
gravitational lenses (Hewitt 1986, Conner 1993, MIT Ph.D. theses), and consists
of four compact radio components. High resolution MERLIN maps show an
unresolved arc extending between the two brightest images. We present radio
and optical observations of this system, and preliminary models of the lensing
mass.

Session 34: HAD
Oral Session, 2:15-3:45 pm
Salons A/B

George Ellery Hale, Ernest Fox Nichols, and Radiometry at the Yerkes
Observatory

R.S. Brashear (Huntington Library)

In the 1890s, George Ellery Hale, Director of the Yerkes Observatory, at-
ttempted to detect the solar corona when the Sun was not in eclipse. His failure
to detect the corona optically led him to see if he could discover any indications
of coronal heat with the use of bolometers. At first, Hale wanted to find coronal
heat during a total eclipse in order to determine whether the heat was signifi-
cant enough to be measurable out of eclipse. Hale would often try to enlist
the aid of others traveling to distant eclipse sights by asking them to perform
certain bolometric observations. Ernest Fox Nichols's work with the modified
Crookes radiometer led Hale to attempt to appropriate Nichols for his coronal
research. Hale's scheme backfired when Nichols insisted on measuring stellar
heat, not coronal heat. Although Hale was initially disappointed, Nichols's
results at Yerkes made Hale realize the potential value of radiometric research
in astrophysical problems.

Walter Baade and the Southern Hemisphere

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The inception of the European Southern Observatory is generally traced to
Walter Baade's discussions with Jan Oort during his visit to Leiden in the spring
of 1953. However, these discussions had certainly been underway between
them previously, during Oort's visit to Pasadena in early 1952. Furthermore,
Baade's great interest in southern-hemisphere astronomy and his strong desire
to observe there can be traced far back in his career.

In 1927, after his return to Germany from a year in the U.S. under a Rockefeller
fellowship, Baade reported that his country had no chance to catch up with
American astronomy in the northern hemisphere. He advocated moving the
Hamburg 1-meter reflector to the southern hemisphere to get in ahead of the
U.S. with an effective telescope there. Baade emphasized the research that
could be done on high-luminosity and variable stars in the Magellanic Clouds.
Later, after he had joined the Mount Wilson staff, his early attempts to locate
the center of our Galaxy and globular clusters near it (in 1937) and his observational
study (with Edwin Hubble) of the Sculptor and Fornax dwarf galaxies (in 1939)
re-emphasized to him the need for a southern observatory.