A SELECTION OF GALAXIES FROM THE CSRG: IMAGING OF OUTER RINGS AND PSEUDORINGS

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Outer rings and pseudorings are features commonly observed in disk galaxies in the range of Hubble types $S0^+$ to Sab (see, for example, de Vaucouleurs 1975). As part of a general program to study the nature of rings in disk galaxies, we have begun imaging a large sample of outer rings to study their morphological and photometric properties in detail. Our goal is to evaluate whether these rings are related to the outer Lindblad resonance (OLR), a major 2:1 resonance known to be important for ring formation in n-body models where dissipation in the gaseous component is significant (Schwarz 1981 = S81). The morphology of outer rings is important because S81 predicted that near the OLR two major families of periodic orbits can lead to formation of two morphologically distinct types of outer rings and pseudo-rings: one type elongated perpendicular to the bar with arms intersecting near the bar axis, and the other elongated parallel to the bar with arms intersecting 90° to the bar axis. These ring types were searched for on the SRC IIIa-J sky survey copy films by Buta (1986), who called them R'_1 and R'_2, respectively. The full results of Buta's SRC search, which includes other types of rings, is being prepared as the *Catalogue of Southern Ringed Galaxies* (Buta and Crocker, 1990 = CSRG) and its contents are discussed in Buta (1990, this conference).

We have imaged in the B, V, and I_C passbands 30 CSRG outer-ringed and pseudoringed galaxies using the CTIO 1.5-m telescope and a TI CCD. Our sample includes 13 R_1, R'_1 rings, 8 R'_2 pseudorings, and 3 mixed type ($R_1R'_2$) rings. Of the eight showing the R'_2 morphology, four have only the slightest trace of a bar, which is evident mainly in the I-band. Conversely, 12 of the 13 R_1 cases have very obvious bars or ovals, even in blue light. Our observations tentatively support the hypothesis that outer rings and pseudorings are related to the OLR, but highlight some of the limitations of pure gas-dynamical n-body models. A full discussion will be contained in an article to be submitted to the Astronomical Journal.

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