

## THE STELLAR POPULATION AND INTERNAL KINEMATICS OF THE SEXTANS DWARF SPHEROIDAL GALAXY

Mario Mateo (OCIW), Nick Suntzeff (CTIO), James Nemec (WSU),  
Donald Terndrup (OSU), William Weller (CTIO), Edward  
Olszewski (Steward), Michael Irwin and Richard McMahon (Cambridge)

The Sextans dwarf Spheroidal (dSph) galaxy was discovered recently by Irwin, *et al.* (1990, *M. N. R. A. S.*, **244**, 16p). We report results concerning a number of the global properties of the stellar population of this system. Based on deep CCD photometry obtained with the prime-focus CCD camera on the CTIO 4m telescope, we find that the galaxy is dominated by an old stellar population, similar to that observed in the Draco, Sculptor, and Ursa Minor dwarfs. Some blue stragglers are also present; if these are associated with an intermediate age component, they indicate that only a tiny fraction of the stellar population of Sextans is younger than about 10 Gyr. Based on the apparent magnitude of the predominately red horizontal branch, we conclude that the true distance modulus of Sextans is  $19.7 \pm 0.3$ , and the total luminosity of the galaxy is  $5.2 \times 10^5 L_{\odot}$ . A complete description of these results is given in Mateo, *et al.* (1991, *A. J.*, **101**, 892).

A series of CCD exposures obtained with the Las Campanas 1m telescope has been used to search for variable stars in Sextans down to the level of the horizontal branch. We have identified 41 RR Lyr variables and three anomalous Cepheids within about 0.6 core radii (10 arcmin) of the center of the galaxy. The identification of RR Lyr stars confirms the presence of an old population in Sextans. The ratio of the number of anomalous Cepheids and blue stragglers in Sextans is similar to that observed in the Ursa Minor dSph (Olszewski and Aaronson 1985, *A. J.*, **90**, 2221). The mean period of the AB RR Lyr stars is 0.61 days. From the mean color of the giant branch at the level of the horizontal branch, we derive a mean abundance for Sextans of  $[\text{Fe}/\text{H}] = -1.9$ ; however, the large spread in the colors of the giants implies a significant heavy element abundance spread in the galaxy.

We also report spectroscopic results for 80 candidate red giants towards the center of Sextans. These data were obtained using the ARGUS fiber spectrograph at the CTIO 4m. Forty-four of these stars are likely members of the galaxy based on radial velocities measured using the near-IR Ca II triplet. From these data we derive a central velocity dispersion of  $6.5 \pm 1.7 \text{ km s}^{-1}$ . Using the current best estimates of the structural parameters of Sextans yields a central  $M/L = 31$ , and a central mass density of  $0.07 M_{\odot} \text{pc}^{-3}$  for an assumed isotropic distribution of stellar orbits. These results imply that a significant dark matter component is present in Sextans, although the central density of this component is considerably less than deduced for the Draco and Ursa Minor dwarfs. All three galaxies have similar total luminosities. The mean metallicity of Sextans is  $[\text{Fe}/\text{H}] = -2.1$  based on the strength of the Ca II triplet for the seven giants with the best spectra. These data also support the existence of a significant abundance spread in the galaxy.