

## FAINT OPTICAL SPIRAL TRACERS

Juan C. Muzzio<sup>1</sup>

Observatorio Astronómico de la Universidad Nacional de La Plata, and Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina

The use of modern photographic emulsions and techniques allows for the discovery of optical spiral tracers much fainter than was possible in the past. Our searches for such faint objects deal with the Puppis, Vela, Crux, Circinus, Norma and Ara regions of the Milky Way using Kodak plates (baked in dry nitrogen) obtained with the Curtis Schmidt-telescope at Cerro Tololo Inter-American Observatory. We have discovered OB stars as faint as 15 mag on IIIa-J plates obtained with the thin prism, and H $\alpha$  emission-line objects (many of which are Be stars) as faint as 16 mag on 127-04 plates obtained with the 4° prism.

The study of those faint objects offers the opportunity to improve the optical picture of the spiral structure of our Galaxy by allowing: a) to reach larger distances from the Sun, and b) to compensate the bias caused by heavy obscuration in some regions. In fact, distances larger than 4 kpc and total visual absorptions exceeding 4 mag are not uncommon among the objects we found.

Unfortunately, the derivation of the distances of the optical spiral tracers to the Sun has not progressed accordingly. It is still difficult to obtain an accuracy better than about 15% for stellar groups or 30% for single stars, and the situation is worst for faint objects. Besides, a warning should be made concerning the use of H $\beta$  photometry to derive distances of early type stars. It is not unfrequent that the wide and narrow filters have different effective wavelengths and, as a result, the measured  $\beta$  index depends on the color excess of the star. We found that this effect is much more important than was previously thought, particularly for the faint optical spiral tracers which are usually highly reddened. The effect is present even in the filters used to define the standard system and the current calibrations may thus need some revision.

<sup>1</sup>Visiting Astronomer, Cerro Tololo Inter-American Observatory, supported by the National Science Foundation under contract No. NSF-C866.