KINEMATICS OF THE GALACTIC BULGE

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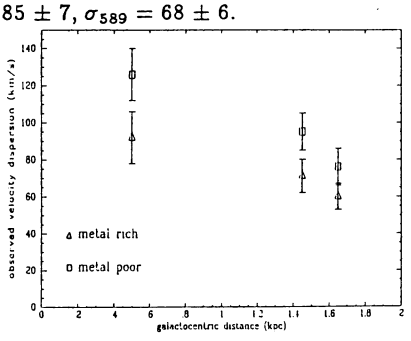
We present spectroscopic observations of ~200 giant stars in two fields toward the Galactic bulge. The positions of fields 588 and 589 are at l,b = (8,7) and (12,3), respectively, which corresponds to a Galactocentric distance of ~1.6 kpc for the stars in the bulge. The K giants were selected from color-magnitude and color-color diagrams produced by scans of B, R and I plates from the APM machine. The spectra were obtained with the MX multi-object spectrograph at the Steward 90" telescope, and with the Red Channel spectrograph at the MMT. Radial velocities good to $\leq$ 10 km/s were obtained from cross-correlation techniques. A grid of ~100 standard stars was built to calibrate spectrophotometric indices that provide abundances and luminosities.

We also present infrared JHK photometry for ~5000 stars at field 588 reaching ~ 2 magnitudes fainter than the bulge HB at K. Metal abundances derived from JHK photometry and spectral indices show a wide distribution, similar to those found by other studies in fields along the minor axis of the Galaxy (*e.g.* Terndrup *et al.* 1991, Ap.J. 357, 453).

The bulge of the Galaxy is found to be rotating, the mean velocities for fields 588 and 589 being 45 $\pm$ 10 and 78 $\pm$ 9 km/s, respectively. The bulge velocity dispersion decreases with increasing Galactocentric distance, we find $\sigma_{588} = 85 \pm 7$, $\sigma_{589} = 68 \pm 6$.

When dividing the samples into metal rich and metal poor stars, we find a correlation between [Fe/H] and σ, and possibly V_{rot}, in the sense that the metal rich population seems to have a lower velocity dispersion. Figure 1 shows the run of σ for K giants in the bulge from the present work and the observations of Rich (1990, Ap.J. 362, 604) at the Baade window field. This suggests that dissipational collapse could have played an important role in the formation of the bulge.



We study the shape of the velocity ellipsoid of the Galactic bulge on the basis of our radial velocities in the field at l,b = (8,7) and proper motions from Cudworth (1986, A.J. 92, 348) in the field of the globular cluster M22 at l,b = (9.9, -7.6). The velocity ellipsoid at a Galactocentric distance of ~ 1.6 kpc is found not to be significantly flattened. This confirms our suggestion that the Galactic bulge is flattened by rotation rather than by velocity anisotropies. The proper motions also show the trend of higher σ for lower [Fe/H] seen on the radial velocity samples. If the bulge velocity ellipsoid is indeed nearly isotropic, we derive a rather small distance to the Galactic center ($R_\odot \approx 7$ kpc).

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