The Muenster Redshift Project — A Progress Report

The aim of the Muenster Redshift Project (MRSP, Seitter et al. 1989; Duerbeck et al 1989) is to use large samples of optical data to find constraints for fluctuations of galaxy number densities on various scales (Schuecker & Ott 1991; Seitter 1992a, b), constraints for number evolution of galaxy pairs in two and three dimensions (Boschan & von Kürten 1993), to detect distant clusters and to provide estimates of their redshift (Naumann 1991; Ungruhe 1991), to determine galaxy luminosity and diameter functions (Schuecker 1990), mean values of internal absorption in spiral galaxies (Cunow 1992a), and the cosmological parameters H_0 (Duemmler 1992), Ω_0 (Ott 1988), Λ (Feige 1992). The statistical approach to these topics relies on fully automated measurements and reductions, using pairs of direct ESO/SERC J and F Schmidt plates and UK objective prism Schmidt plates. The film copies are digitized with two microdensitometers PDS 2020 GM^{plus}. From the direct plates, object positions, star/galaxy separation, semi-major and minor galaxy axes, position angles (Horstmann 1992), magnitudes (Cunow 1992b, c), and morphological galaxy classification (Spiekermann 1992) are obtained. From the very low dispersion objective prism plates (reciprocal linear dispersion 246 nm mm^{-1} at Hγ) redshifts are measured, and for 75% of the galaxies with $z \leq 0.3$ the error distribution yields $\sigma(z) = 0.012$ (Schuecker 1993).

In order to keep the magnitude limits constant over the total survey area, CCD sequences are presently observed with the SAAO–1.0 m and ESO/DUTCH–0.9 m telescopes. Wavelength zero points for the redshift measurements are obtained by astrometric transformation of object positions from the direct plate to the objective prism plate (Tucholke & Schuecker 1992). Mapping algorithms, combining the results obtained from individual Schmidt plates (Naumann & Ungruhe 1992), and crowded-field algorithms for the analysis of regions with high object number densities (Groeneveld 1992) are being developed.

The derivation of global parameters of the universe relies to a large degree on the proper selection of galaxies for the redshift measurements. In our survey, the classifications of objects obtained from the J *and* F plates can be compared, thus increasing the reliability of the star/galaxy separation process and the morphological classification (Ritzmann 1992). The simultaneous measurements of magnitude, colour, morphological type and redshift permits the proper application of *K*-corrections and the detection of clustering, evolutionary and segregation effects. Data pertaining to the MRSP-catalogues are:

Current status of the MRSP-catalogues

Catalogue	Plate Material	Area □°	m_{Limit}	$N_{Objects}$
Galaxies	ESO IIIa-F	5100	20.0	$7.9 \cdot 10^6$
Stars	ESO IIIa-F	5100	20.0	$21.3 \cdot 10^6$
Galaxies	ESO/SERC IIIa-J	400	21.0	$6.5 \cdot 10^5$
Galaxy-Types	ESO/SERC IIIa-J	400	19.5	$1.0 \cdot 10^5$
Stars	ESO/SERC IIIa-J	400	21.0	$1.0 \cdot 10^6$
Redshifts	UKST IIIa-J	300	19.8	$1.2 \cdot 10^5$

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