The Redshift Reject Rubric

MSE White Paper

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The medium multiplexing factor of current facilities, of order hundreds of fibres, means that the majority or entirety of the fibre-set is routinely used in operations to target sources of direct scientific interest. Combined with its large field of view, the order of magnitude jump in multiplicity that MSE will bring implies that many programmes will not be using the full complement of fibres. This will be the case, e.g., when observing galaxy groups that subtend a modest angular size, or targeting discrete sources within individual, nearby galaxies.

While these fibres can simply remain parked, there is little reason for them to not be allocated to the vast plethora of background or foreground sources. By maintaining some simple software written around a source database, the *Redshift Reject Rubric* would set up an operational methodology to implement such a system. This could be of immense utility to the world-wide astronomical community, one that would boost the legacy aspect of this operation and bring significant acclaim.

Such a project would introduce an overhead, albeit slight, to the preparation of observations, so I am proposing it as a programme of voluntary participation for programme PIs. The implementation should be rather simple. The main task is to populate source lists with associated photometry, but that is already prerequisite for preparing any set of observations with a multi-fibre spectrograph. If we ask programme PIs to contribute lists of sources they are not interested in observing, such a database can easily be populated. Not to mention that much of this information will already be available from past imaging surveys.

With that photometric archive in hand, a piece of software can be easily tailored to accept the specifics of the field being observed, being the coordinates of all targets and the field centre, and work out what cohort of background galaxies and foreground stars can be targeted. By also feeding the exposure time for the observation, the software can work out which possible targets will yield reasonable spectra through any existing signal-to-noise calculator (no saturated sources, no noisy spectra).

If the data reduction pipeline allows for it, the spectra can be made available without a proprietary period for the astronomical community to mine whatever gems are hidden: interesting stars for galactic archaeology; galaxy groups and clusters; and eventually large-scale structure.