Flux Calibration for DEEP2 Spectra

We (Jeffrey Newman, Adam Walker, and Renbin Yan) have recently developed routines for flux calibration of DEEP2 spectra, critical for measurements dependent on spectral slopes (e.g. D_4000 measurements). We are making the relevant routines available for collaborative papers with DEEP2 data via the paper proposal process; note that these routines are proprietary and not publicly available. Also be aware that these routines are not appropriate for data not taken in DEEP2 instrumental setups (e.g. they will not work correctly for DEEP3 data).

The calibration is done in two steps.

1) Chip-to-chip throughput correction.

The code to use here is called 'qe_correction2.pro', which can be downloaded here.

It corrects for chip-to-chip QE curve variations and the overall throughput. The corrections are derived from fits with coadded spectra (coadding at constant pixel number rather than restframe wavelength). The overall throughput is based on Ricardo Schiavon's corrections but boosted a bit in the red. The routine can optionally apply telluric corrections and correct for severe chip-to-chip jumps (a 7-sigma threshold seems to work reasonably well).

To use the code, one also needs the parameter files in this directory, which has to be placed in IDLSPEC1D_DIR/etc/ (alternatively you can update your SPEC1D CVS repository if you have one). Here IDLSPEC1D_DIR is an environment variable.
You may also need the code hlmean.pro within your IDL path.

EXAMPLE USAGE:
IDL> spec1d = fill_gap('spec1d.1253.064.12024913.fits',header=header)
IDL> spec1d_corr=qe_correction2(spec1d, header, params, paramsendr, lambda, throughput_table, /telluric, NCORRECT=7)

The resulting spec1d_corr structure gives counts/hr/pixel above the atmosphere. Some of the inputs to qe_correction2 are optional, see the documentation of the code for details (e.g. in IDL, do *doc_library,'qe_correction2'*).

2) Spectrophotometry calibration.

The code specphot.pro converts the spectrum from counts/hr/pixel to energy units --- erg/s/cm^2. It uses the R and I photometry in a spec1d file's header to put it on a flux scale (provides both f_nu and f_lambda). For DEEP2 stars that match SDSS-calibrated templates well, the results seem good to 10% or better.

EXAMPLE USAGE:
IDL> spec1d=specphot(spec1d, header,rlambda,rresponse,ilambda,iresponse)

Again, some of the inputs --- rlambda, rresponse, ilambda, and iresponse --- are optional. They allow speedup of repeated calls.

Condition of Usage

To use this calibration, please first email Jeffrey Newman at janewman **at** pitt.edu. You also need to cite Newman et al. (2013) and acknowledge DEEP2 using the blurb on this page.