The COOL-STAR SPECTRAL CATALOG: A Uniform Collection of IUE SWP-LOs

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Over the past decade and a half of its operations, the International Ultraviolet Explorer has recorded low-dispersion (5 Å resolution) spectrograms in the 1150–2000 Å interval of more than 800 stars of late spectral type (F–M). The sub–2000 Å region contains a number of emission lines – like O I λ1304, C II λ1335, and C IV λ1549 – that are key diagnostics of physical conditions in the high-excitation chromospheres and subcoronal "transition zones" of such stars. Many of the sources have been observed a number of times, and the available collection of SWP-LO exposures in the IUE Archives exceeds 4,000.

With support from the Astrophysics Data Program, we have assembled the archival material into a catalog of IUE far-UV fluxes of late-type stars. In order to ensure uniform processing of the spectra, we: (1) photometrically corrected the raw vidicon images with a custom version of the 1985 SWP ITF; (2) identified, and eliminated, sharp cosmic-ray "hits" by means of a spatial filter; (3) extracted the spectral traces with the "Optimal" (weighted-slit) strategy; and (4) calibrated them against a well-characterized reference source, the DA white dwarf G191-B2B. Our approach is similar to that adopted by the IUE Project for its "Final Archive", but our implementation is specialized to the case of chromospheric emission-line sources.

We measured the resulting SWP-LO spectra using a semi-autonomous algorithm that establishes a smooth continuum by numerical filtering, and then fits the significant emissions (or absorptions) by means of a constrained Bevington-type multiple-Gaussian procedure. The algorithm assigns errors to the fitted fluxes – or upper limits in the absence of a significant detection – according to a model based on careful measurements of the noise properties of the IUE's intensified SEC cameras.

Here, we describe: the "visualization" strategies we adopted to ensure human-review of the semi-autonomous processing and measuring algorithms; the derivation of the noise model and the assignment of errors; and the structure of the final catalog as delivered to the Astrophysics Data System.

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