Template Libraries for the DAP

1. Summary of proposed libraries

In response to the referee report on his paper, Francesco compared how well a set of three template libraries fit the P-MaNGA data, and summarized the results in a PDF presentation attached to his e-mail (manga-sci 1187). This summary is attached to this webpage, as well as some additional plots Francesco has produced. This sparked a chain of e-mails discussing the template library that should/could be used by the DAP. Here is a quick summary:

1. M11-MARCS: Currently used by the DAP. Francesco reports specific and well-defined failures. These failures have been seen by others as well.

2. M11-STELIB: Francesco advocates this library. Data are available from Claudia's webpage. Seems to have additional support from Claudia & Daniel. Jarle suggests BC03-MILES is better than BC03-STELIB. M11-STELIB appears to do slightly better in terms of chi-square than BC03-STELIB (see attached chi-square plot from Francesco. Note that the resolution is substantially lower than M11-MARCS (3.1-3.4 A)

3. M11-MILES: There also seems to be quite a lot of support for M11-MILES; however, this was not included among the suite of models tested. A clear disadvantage of M11-MILES is its short red cutoff at 7300 A.

4. Individual-star libraries: Michele advocates this to avoid biases (in, e.g., h4 of LOSVD) due to limitations of SSPs. Yanping suggests XSL DR1, but perhaps premature to use this as the template library for DAP. Eventually MaNGA will produce a stellar library to be used...

5. Conroy-Kurucz-Castelli models: Still in development but will have advantages over M11-MILES. High resolution (R~10k) and large spectral range (0.15-1.1 micron). Charlie is keen to provide an early version for testing with the DAP.

6. MIUSCAT: Suggested by Jesus. They are the combination of MILES, INDOUS and CaT libraries all at the MILES spectral resolution. They thus have a spectral range comparable to MaNGA data. It is useful to note that Eric Emsellem is currently using these models to generate mock galaxy observations.

2. Data format for use in the DAP

For testing purposes, and ultimately as a user-level option, we'd like to be able to use many (all) of these libraries with the DAP. For **all** of these libraries, their inclusion in the DAP critically depends on a detailed provision of their wavelength calibration, units, and spectral resolution. The spectral resolution should be as accurate as possible, allowing for the resolution of the template library to be matched to the MaNGA data.

The current format of the M11-MARCS models, as read by the DAP, is a set of 1D, single-extension fits files. The spectra are linearly sampled in wavelength, with CRVAL1, CRPIX1, and CDELT1 keywords that define the wavelength solution. These spectra also contain a FWHM keyword with the spectral resolution (still unclear if this is correct or not).

For immediate inclusion of any library, it would be easiest to do so if it was available in a similar (or identical) format. However, the final format of the input template libraries read by the DAP may be

different.

3. DAP Template Libraries

The available template libraries in the DAP are listed in the Technical Reference Manual. See:

- DAP v1_0_0: MPL-3 TRM Section 9.2.3.3

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Attachments (5)