**General description:**  
We have modified how Nirfast manages and indexes source-detector pairs. These changes should make s-d pair management simpler, more transparent for users and more robust for developers of nirfast.

**Compatibility:**

These changes affect mesh files, data files, and how the system indexes s-d pairs. It is fully backwards-compatible with old meshes. Load mesh will load legacy meshes and convert them to the new format. When a mesh in the workspace is saved using save\_mesh.m, it will be saved in the new format. **Data files from experimental systems should be converted to the new format, described below.**

*Changes to program files:*

Many programs in Nirfast were updated to make these changes possible; however, the change should be nearly invisible to the general user, provided the new format for saving data from experimental is followed. Developers who want to know what files were modified should contact Mike J, Scott, or Mike M.

**Data files and structure:**

The source-detector link information is now extracted directly from the data file whenever data is used in Nirfast (e.g in the calibration and reconstruction programs). This differs from previous versions of Nirfast which used the link information in whatever mesh was used. **In the new version, calibrating and reconstructing data does not require the mesh to have a link file since the link information is extracted from the data file.** **If the mesh does have a link file (or the mesh workspace variable has a .link field), it will be ignored**. This obviously does not apply to forward calculations since forward model programs do not use a data variable as an input.

*File structure:* **How to save data**

Data files should now contain a 3 column list in front of the data: The first column is the source number, second column is the detector number, and the 3rd column (titled 'active') signals whether that s-d pair is to be used in calculations (0 or 1). Data files for spectral acquisitions will have multiple 'active' columns - one for each wavelength. ‘data’ workspace variables (either calculated using the forward model or loaded using load\_data.m) now have a field called data.link which contains this link information.

*Data file examples:*

Standard example:

source det active amplitude phase

1 2 1 0.00303828 27.5337

1 3 1 0.000108182 47.6435

1 4 1 7.84477e-006 66.6764

1 5 1 8.45395e-007 83.9663

etc.

Spectral example (3 wavelengths shown for brevity). Note each wavelength has a column signifying whether the source is “active” (=1) or “inactive” (=0)

source det w661 w735 w761

1 2 1 0.0013 32.267 1 0.0036 37.41 1 0.00312 34.66 1 3 1 2.6e-005 57.72 1 0.0001 69.08 1 0.0001 63.09

etc.

Fluorescence example:

source det active xphase xamplitude flphase flamplitude mmphase mmamplitude

1 2 1 0 0.00212301 0 7.57358e-005 0 0.00336323

1 3 1 0 6.20946e-005 0 6.05683e-006 0 0.000159775

etc.

**Mesh variable structure and mesh file changes:**

**mesh structure:**

*mesh.link* is now a 3 column list: first column is the source number, second column is the detector number, and the 3rd column (titled 'active') signals whether that s-d pair is to be used in calculations (0 or 1). Spectral mesh.link variables have multiple 'active' columns - one for each wavelength.

*mesh.source* field now has a sub-field called mesh.source.num. This is a list of numbers which "number" the source. Thus, the source number is no longer based on the index - i.e. your sources can start with something other than 1, and can be in any order, as long as mesh.source.num matches mesh.source.coord, and mesh.source.fwhm.

*mesh.meas* field now has a sub-field called mesh.meas.num. This is a list of numbers which "number" the detector. Thus, the detector number is no longer based on the index - i.e. your detectors can start with something other than 1, and can be in any order, as long as mesh.meas.num matches mesh.meas.coord, and mesh.meas.int\_func.

**mesh files:**  
*\*.link* has been changed to a 3 column list: first column is the source number, second column is the detector number, and the 3rd column (titled 'active') signals whether that s-d pair is to be used in calculations (0 or 1). \*.link files for specrtal meshes have multiple 'active' columns - one for each wavelength. Example:

source detector active

1 2 1

1 3 1

1 4 1

1 5 1

1 6 1

1 7 1

. . .

*\*.source* files have been changed to contain source numbers - Nirfast no longer uses the position in the file to number sources. Example:

fixed

num x y fwhm

3 41.1885 -8.19295 0

2 34.9146 -23.3293 0

1 23.3276 -34.9121 0

4 8.19192 -41.1834 0

*\*.meas* files have been changed to contain detector numbers - Nirfast no longer uses the position in the file to number detectors. Example:

fixed

num x y

3 41.1885 -8.19295

2 34.9146 -23.3293

1 23.3276 -34.9121

4 8.19192 -41.1834