# SPIRE FTS Pipelines

## Trevor Fulton

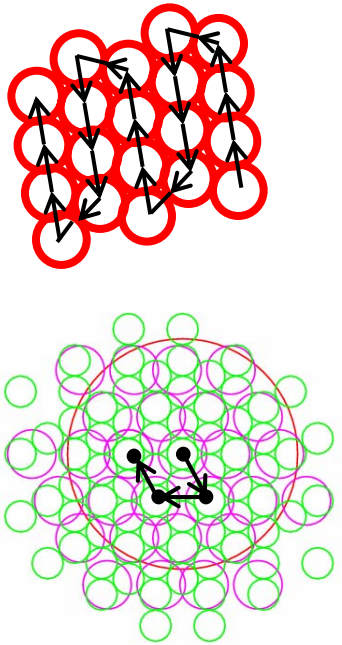
**Blue Sky Spectroscopy**
**Lethbridge, Alberta, Canada**

# SPIRE FTS Standard Pipeline Delivery

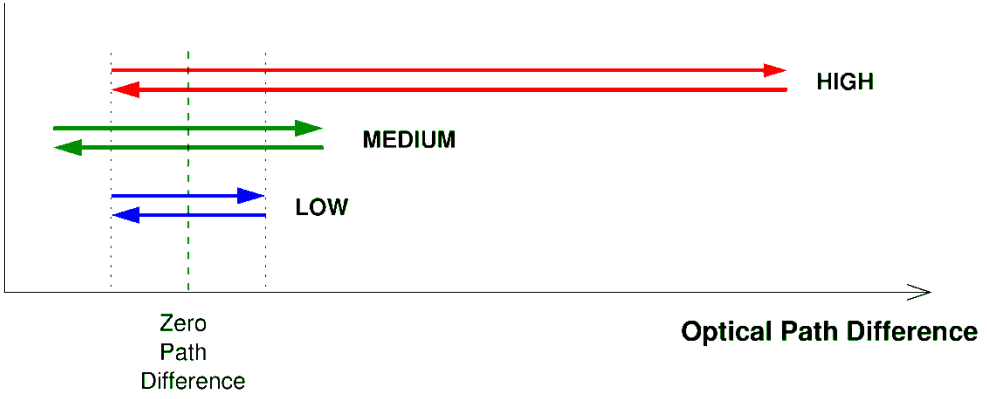
- Observing Modes for the SPIRE FTS
  - Observing Modes
  - Observing Mode Structure
- SPIRE FTS Pipeline
  - Overview
  - Data Products
  - Processing Steps
    - Modify Timelines
    - Create Interferograms
    - Modify Interferograms
    - Create Spectra
    - Modify Spectra
    - Spectral Cube Creation

# Reminder of Observing Modes

| | | | |
|---|---|---|---|
| **Pointing** | •Single<br>•Raster | **Move telescope** | **Goal ...** |
| **Spatial Resolution** | •Sparse<br>•Intermediate<br>•Full | **Move BSM (1, 4 or 16 positions)** | **Goal ...** |
| **Spectral Resolution** | •Low<br>•Medium<br>•High | **Scan the mechanism different distances** | **Goal ...** |

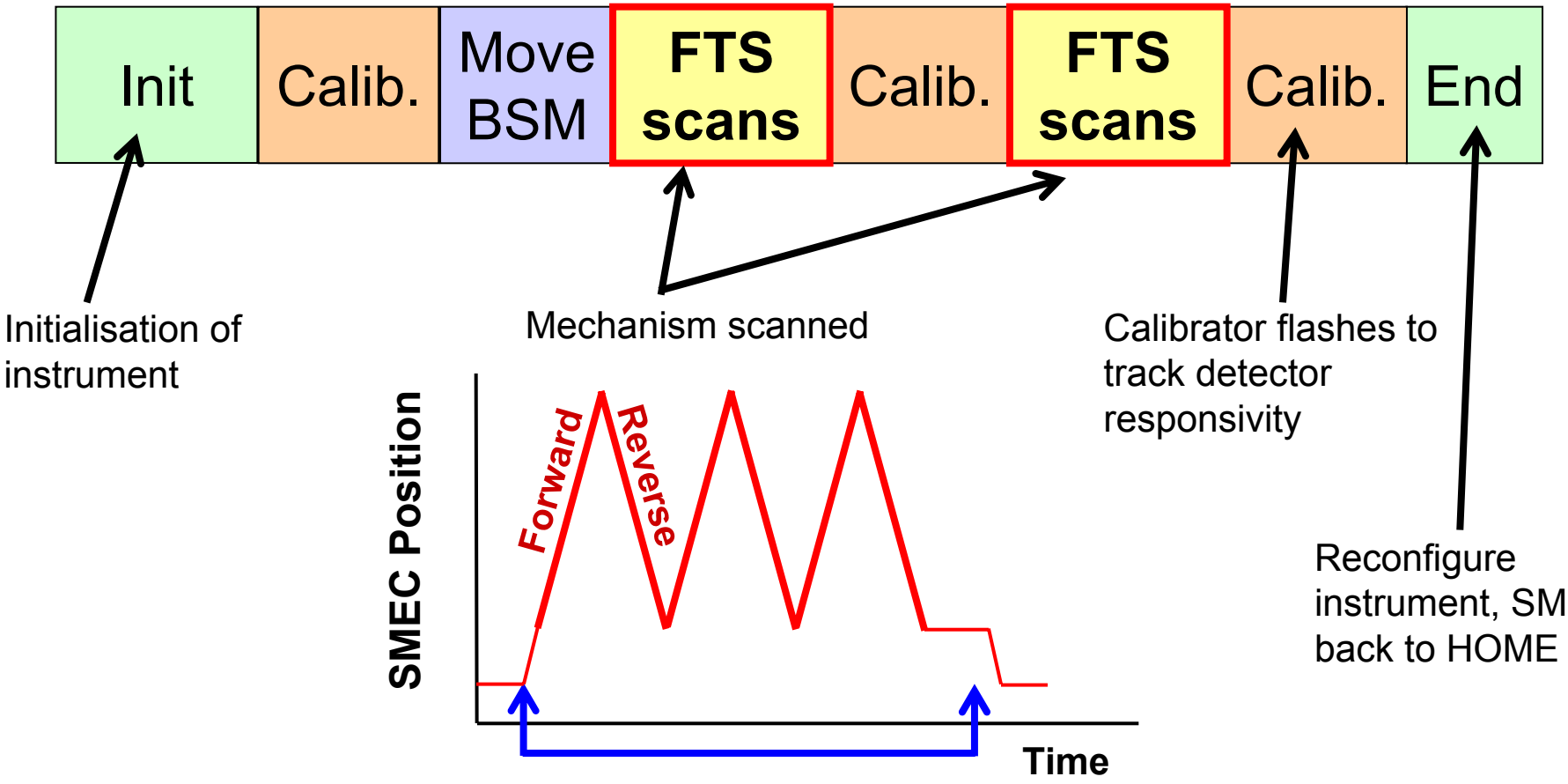


***Mechanism Scan Repetitions*** =
number of scan pairs
(forward+reverse)
Minimum of 2 pairs

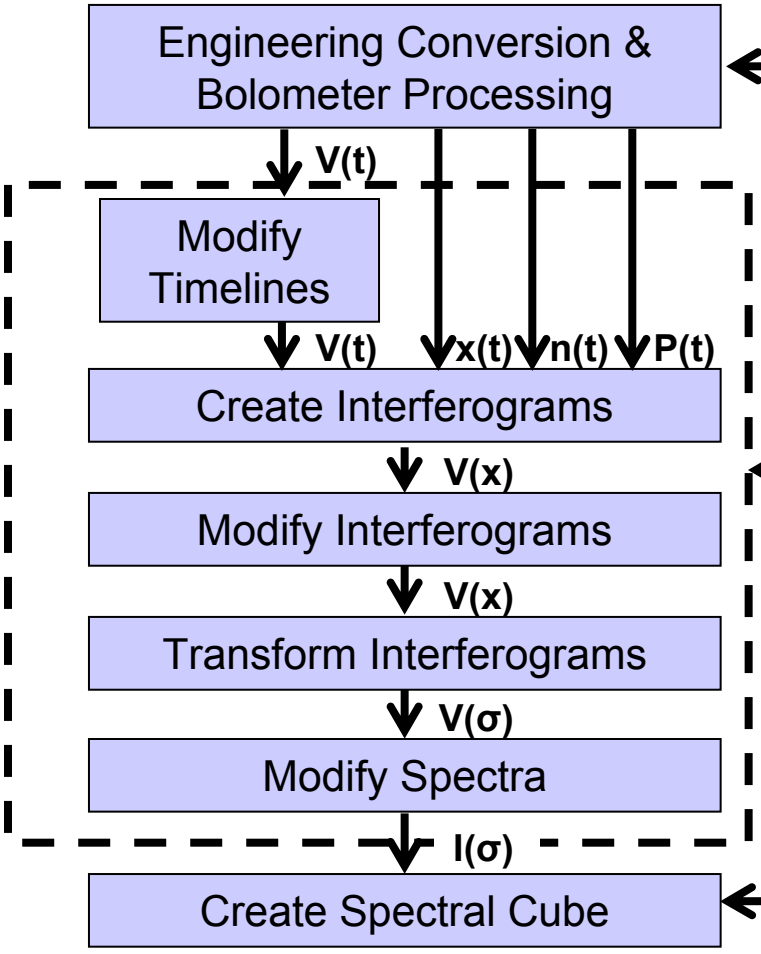


# SPIRE FTS Observations

- Observations are divided into ***Building Blocks***:



# FTS Pipeline – Steps

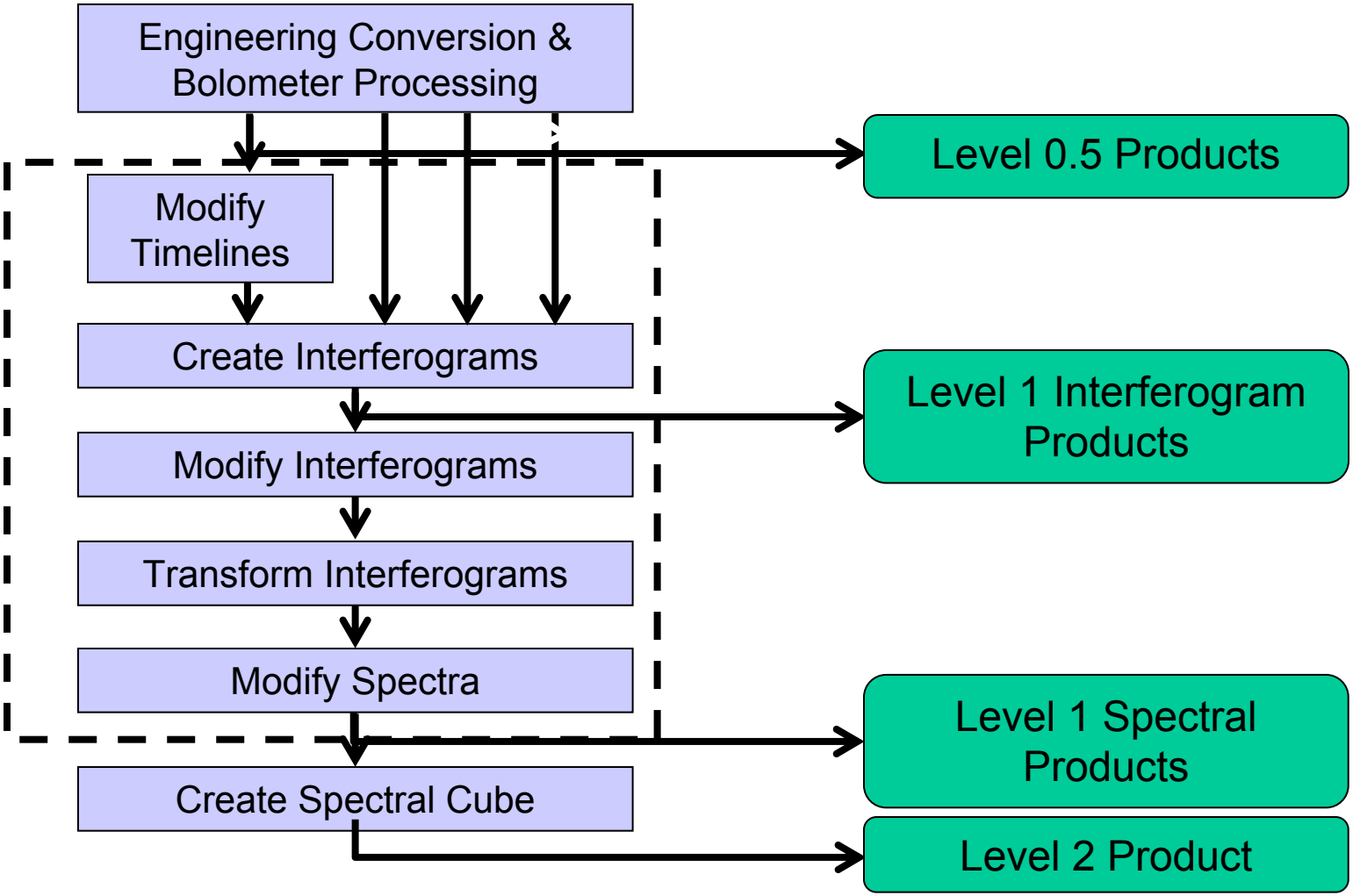



Apply these steps to All Building Blocks

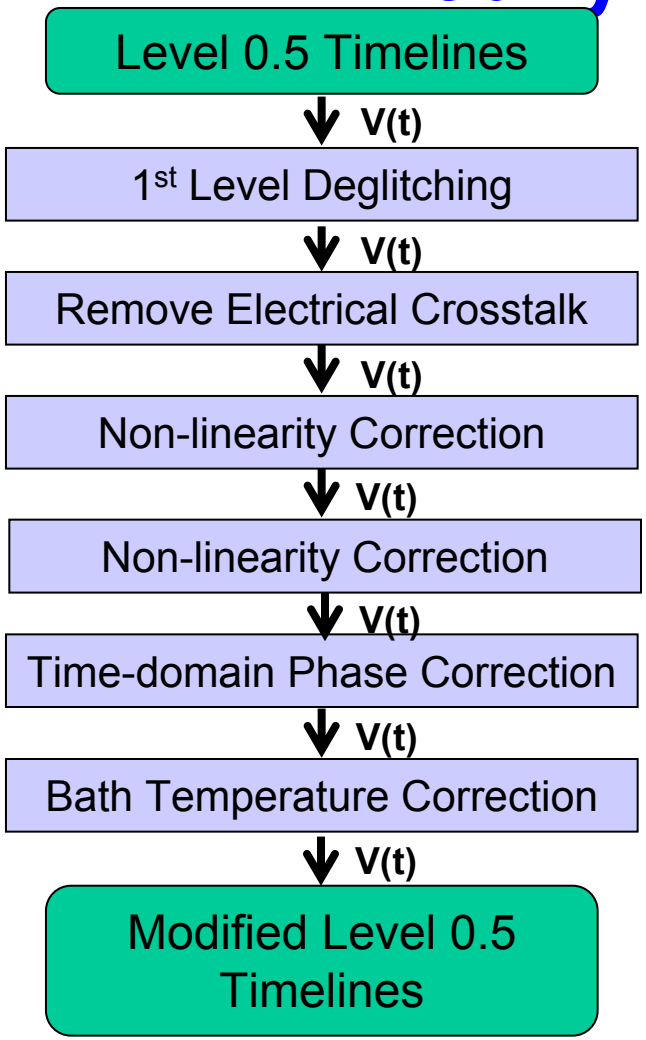
Repeat the steps in this section for each FTS Scan Building Block

Merge the results from the FTS Scan Building Blocks

# FTS Pipeline – Outputs

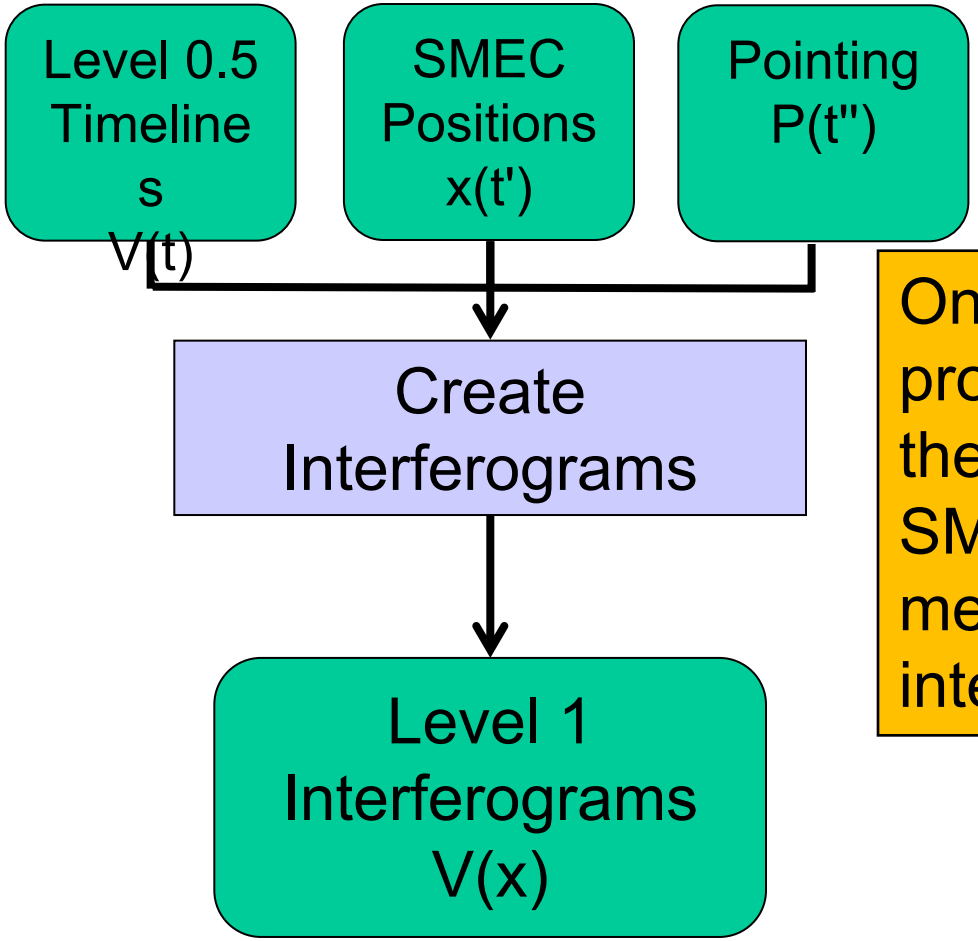


# Modify Timelines



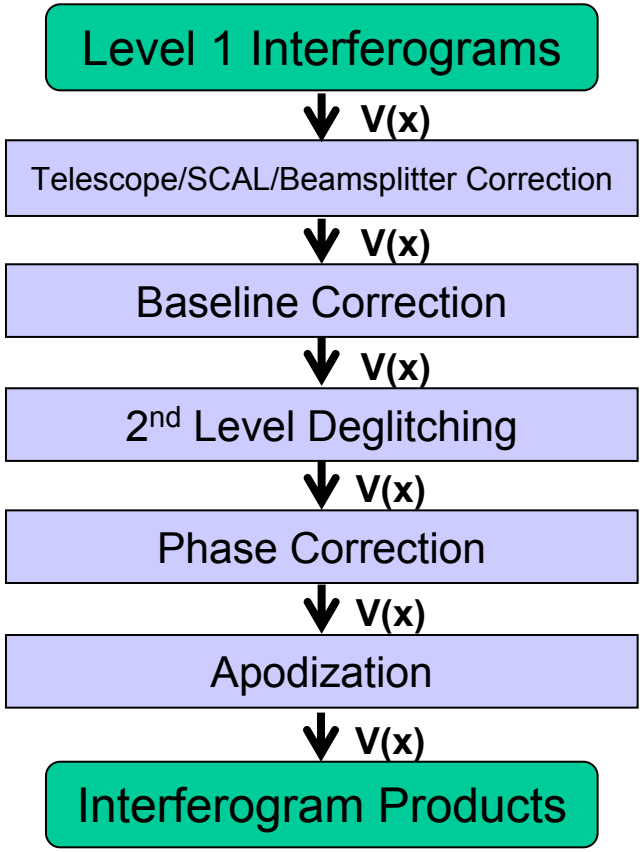

The steps in this section of the pipeline are best applied to the measured detector signals in the time domain

# Create Interferograms



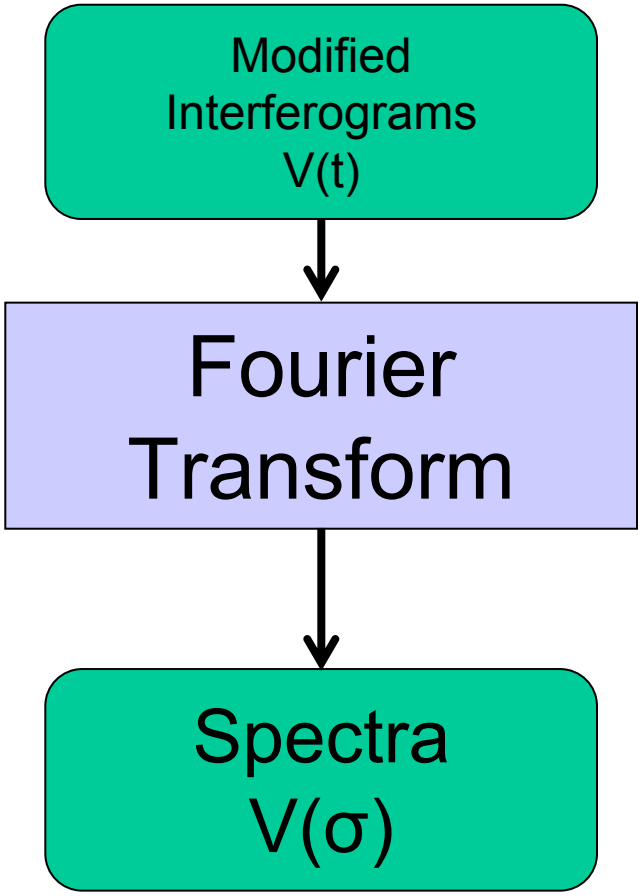

Once time domain processing is complete, the detector signals and SMEC positions can be merged to create interferograms.

# Modify Interferograms



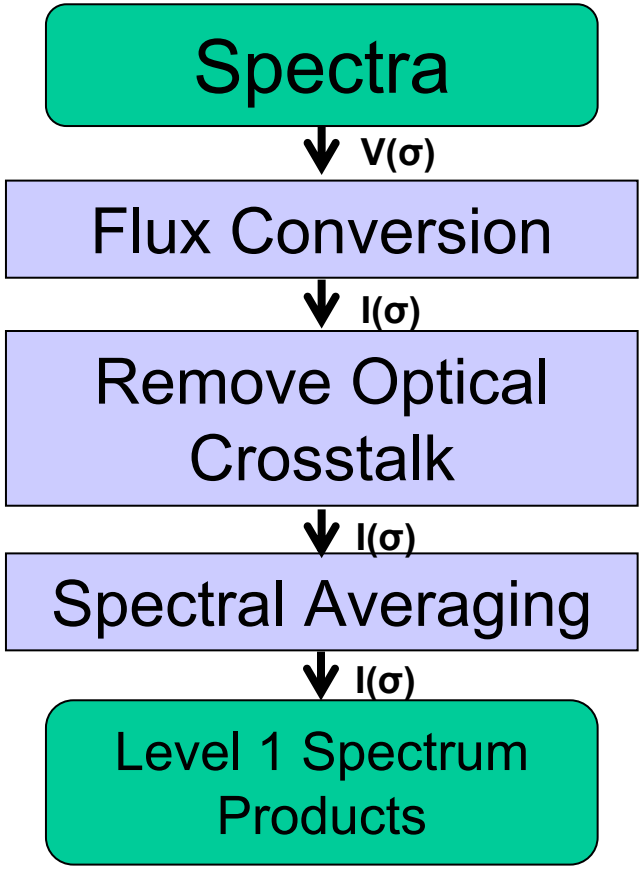

The steps in this section of the pipeline take advantage of the positional redundancy of the interferograms from each mechanism scan.

# Transform Interferograms



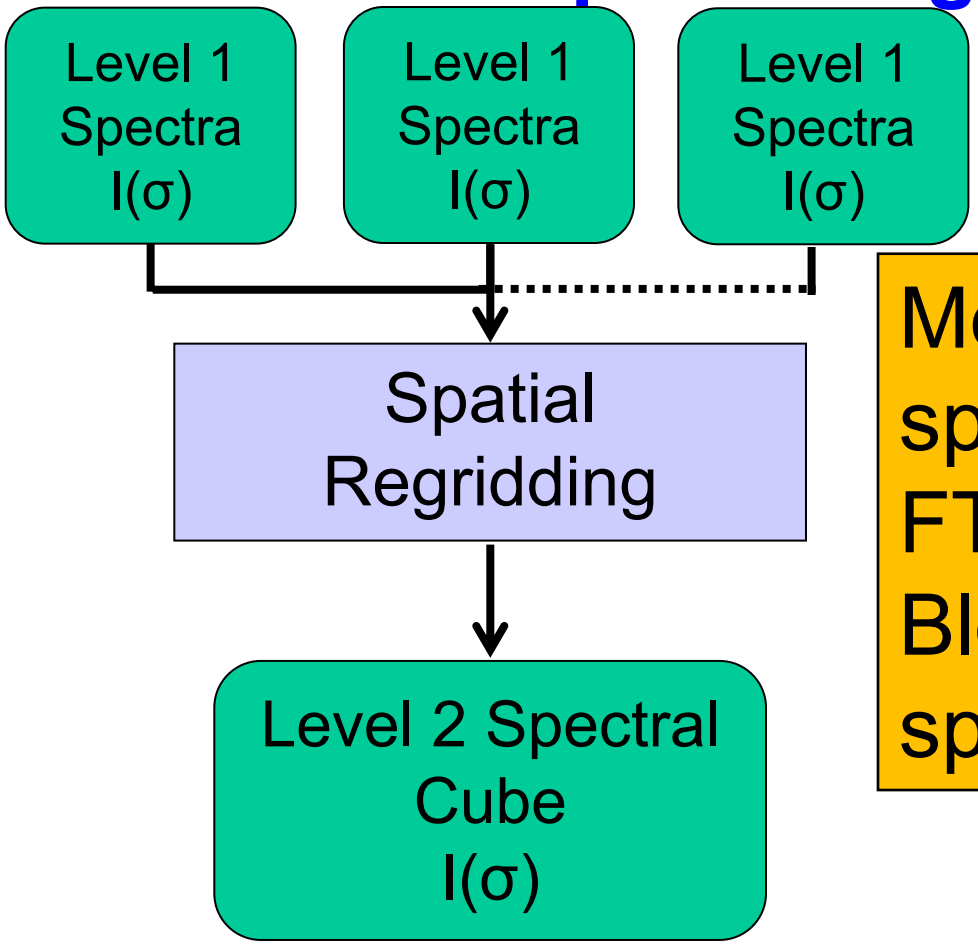

Apply the Fourier Transform to each interferogram to create a set of spectra for each spectrometer detector.

# Modify Spectra




The steps in this section of the pipeline are best applied in the spectral domain.

# Spatial Regridding




Merge the Level 1 spectra from each FTS Scan Building Block into a single spectral cube.