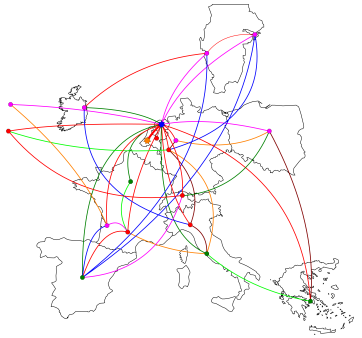
HIFI Data and Pipeline Overview

Russell Shipman, Max Avruch, Miriam Rengel, Adwin Boogert Umut Yildiz, Per Bjerkeli, and Carolyn McCoey



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HIFI Downlink Activities

- HIFI has completed 5 days of PV, the 6 observations are derived from these days.
  - Not a PV overview and results talk.
  - Jan 11, startup with HIFI using redundant side.
  - HIFI Hands on workshop ~March 2010
- In the last months,
  - Much effort in understanding the data we do have.
    - Improvements in the AOTs and processing of AOTs
    - Clarity into needed tools for processing real HIFI data. .
  - Creation of Level 0 pipeline. Mostly Quality checks.
  - Flags and quality checks introduced for spurs (Impure LO settings).
  - Improvements in various tools (resampling/stitching/SpectrumExplorer/Linefitting).
  - HIPE Training of Key programs

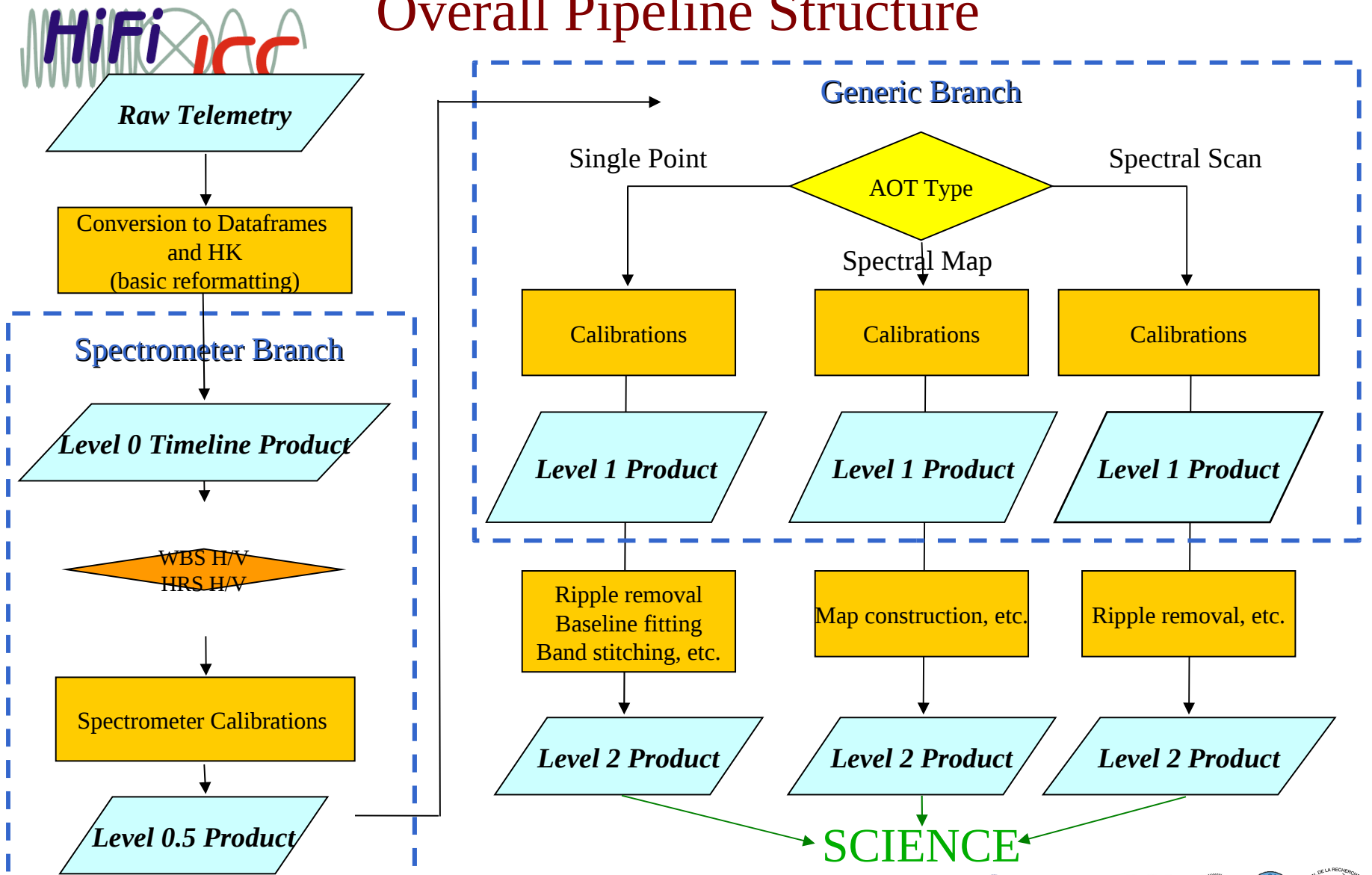
What this session should provide

- Important items to know:
  - Running the HIFI Pipeline
  - How to interpret an observation?
  - Getting to a spectrum and viewing it.
  - Sources of help information (Applicable, command line echoing, URM, HIFI UM, HIFI Pipeline Specification)
  - Level 1 as focus of further processing.
- Tools for HIFI data
  - Spectrum Explorer
  - Subband stitching, resampling, extracting, mathematical operations.
  - Exporting to Class
  - Understanding and Removing Standing waves
  - Running level 2 pipeline.

Status of the HIFI Pipeline

- Not fundamentally different than last March:
  - better understanding of how astronomers want and need to work with it has changed
- Improvements and updates to reported Quality information. e.g., was HIFI properly pumped?
- Processing from Level 1 to Level 2 will get an overhaul by 3.0.
  - Configurable,
  - standing wave corrections, baseline removal before averaging,
  - Hiclass.py demo.
  - FitHifififringe demo.
  - Configuring Level 1 to 2 pipeline

Overall Pipeline Structure



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Spectrometer Pipelines (Level 0 → 0.5)

Green: opt. user input/choice
Cal calibration file in/output
Q quality check file in/output

WBS Level 0 Product

- Find and Flag Bad Pixels ↔ Cal
- Subtract Dark Current Levels — dark pixels?
- Non-Linearity Correction ↔ Cal
- Zero Level Subtraction ↔ Cal — interpolation method time domain?
- Frequency Calibration → Q, ↔ Cal — WBS comb or HRS?
- Derive Attenuator Setting Corrections → Cal
- Sub-band Splitting
- Create list of spur candidates

Level 0.5 Product

Generic Modules

HRS Level 0 Product

- Compute Offset Power
- Normalize Correlation Function
- Correct for A to D Quantization ← Cal
- Gain Non-Linearity Power Correction ← Cal
- Apply Windowing — Hanning/none
- Autocorrelation Funct. Symmetrization — Multiple/ power of 2
- Spectrum in Freq Domain and Scale
- Smoothing — Hanning/none
- IF Non-Linearity Flux Correction ← Cal

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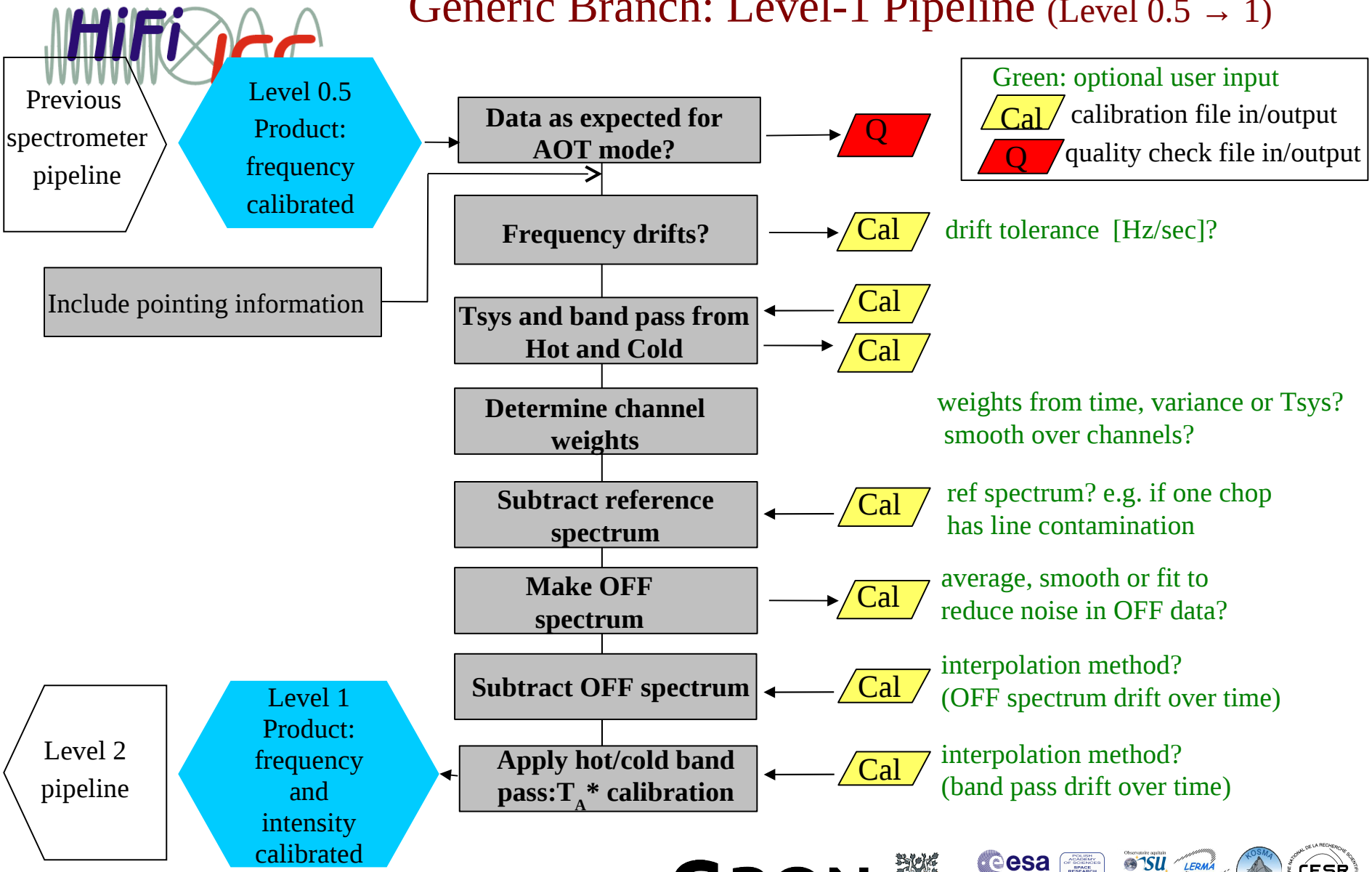
CSIC CAMK University of Waterloo ETH NUI MAYNOOTH LERMA ipac CESR CAISMI

Generic Branch: Level-1 Pipeline (Level 0.5 → 1)



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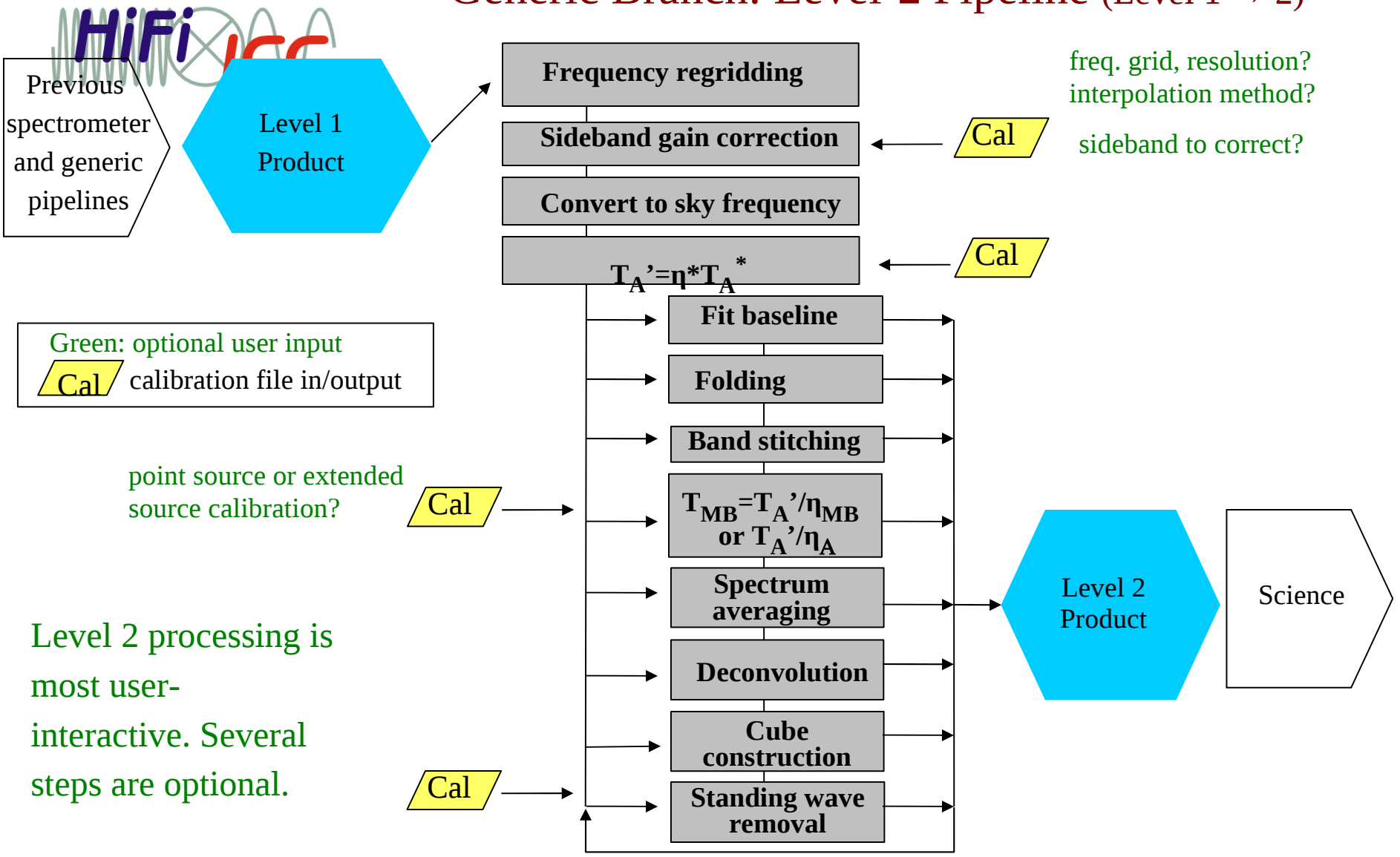
Generic Branch: Level-2 Pipeline (Level 1 → 2)



Level 2 processing is most user-interactive. Several steps are optional.

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