



Each stage short explanation

Data	P/T/A Histogram	Veto Definer	Template Bank		Coincs	
h(t) data from the interferometers. Contains gravitational wave strain	Contains information on distribution of time differences, phase differences and amplitude ratios for coincidences of real signals	Contains information on what times in the data are vetoed (not considered for analysis)	The set of waveform templates used to compare to the h(t) data in the matched filtering stage		<ul style="list-style-type: none">• Cross-check triggers between interferometers to see if they are within a certain time window of one another (usually the time-of-flight between detectors)• Calculate the ranking statistic (where it uses p/t/a histogram) this is the transform of the SNR combined with other information to see which coincidence is most like a signal• Requires the triggers to be from same template• Perform timeslides; sequential shifts to collect noise triggers• Split for multi-threaded analysis• One for each coincidence type; HL, HV, LV, HLV• The coincidences will clustered, meaning that only the loudest coins within a certain window will be kept	
Inspiral Jobs	Trigger Merge	Fit by Template	Fit over multiparam			
<ul style="list-style-type: none">• Matched filtering for each detector• Whitened data is cross-correlated with whitened templates to calculate SNR• Usually split up for multi-threaded processing	Collation stage where the inspiral jobs from each detector are re-gathered for passing on to next stages	SNRs of triggers are considered to find distributions. This is done for each template	<ul style="list-style-type: none">• Each template may have small numbers of triggers• Fit coefficients and trigger counts are smoothed among nearby templates to get better statistics• This is done in multiple dimensions, hence multiparam			
Statmap	Foreground Censor	Exclude Zerolag			Add Statmap	
Compare ranking statistics and see how rare they are to calculate FAR	Removes foreground events from loudest singles list for closed box results	Remove triggers from background coincidences which form zerolag coincidences in any other detector combination			<div>Combine the coinc statistics from the different coinc types:</div> <ul style="list-style-type: none">• cluster by time over different types, i.e. highest ranking statistic in HL vs HV vs LV vs HLV• recalculate overall FAR	
Injection Creation	Inspiral	Coincs	Statmap_inj	Add Statmap Inj	Calculate/Merge PSDs	Optimal SNR
Make waveforms which are to be injected into the data of each IFO, store their information	The same as the inspiral for full data, except that the injections have been added in	Same as coincidence stage in full data Except uses trigger fitting from full data	Calculates FARs for injection zerolag Uses background from full_data (from exclude_zerolag)	Combine FAR calculation from statmap_inj Cluster over coincidence types	Calculate and collate power spectral density information for each detector	Calculate the SNR with which a signal would be found in an optimal search