

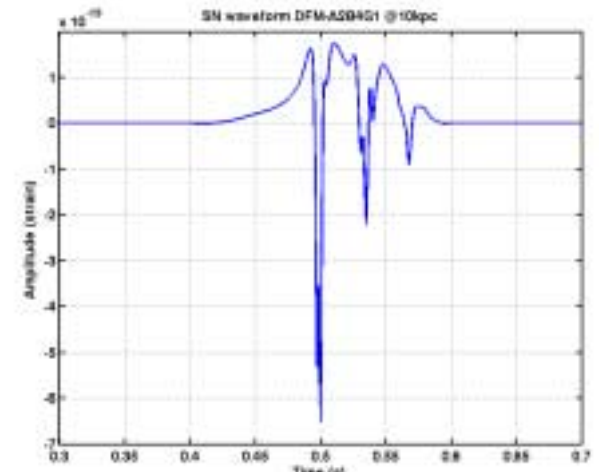


Triggered (Pulsed) Burst Search Method Update

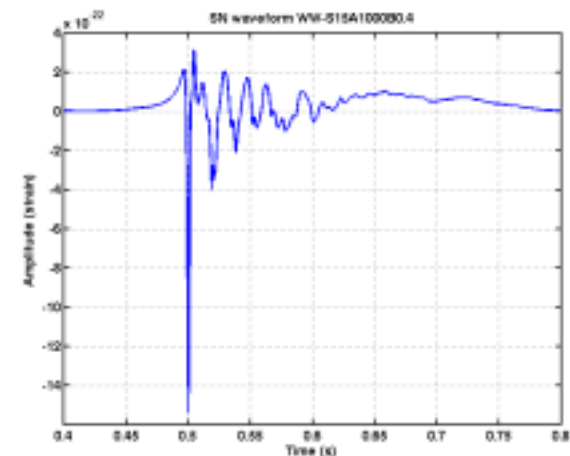
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on behalf of R. Rahkola (UofO)

Motivation to look for pulsed bursts

- Some modeled GWs assoc. with external triggers exhibit pulsed bursts (≥ 3 bursts, each \sim few ms)
- Wish to avoid matched filtering, explore larger phase space
- Use cross-correlation to reduce local noise



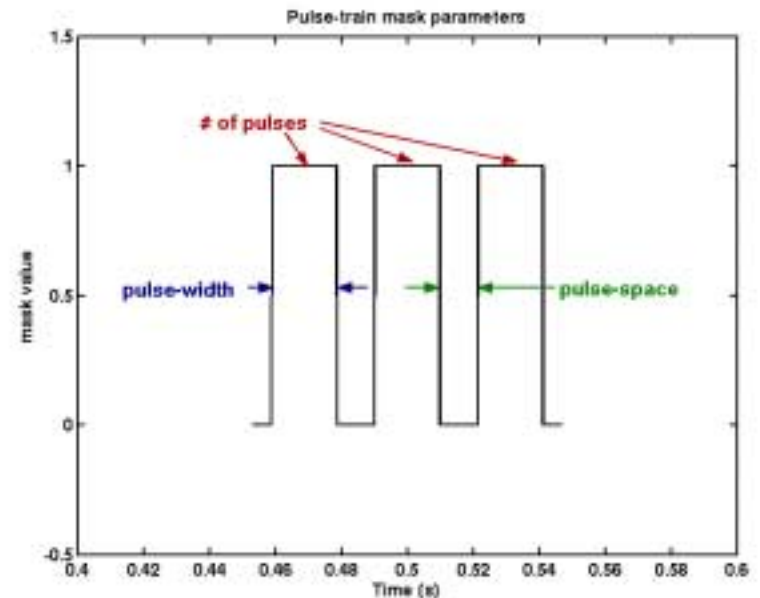
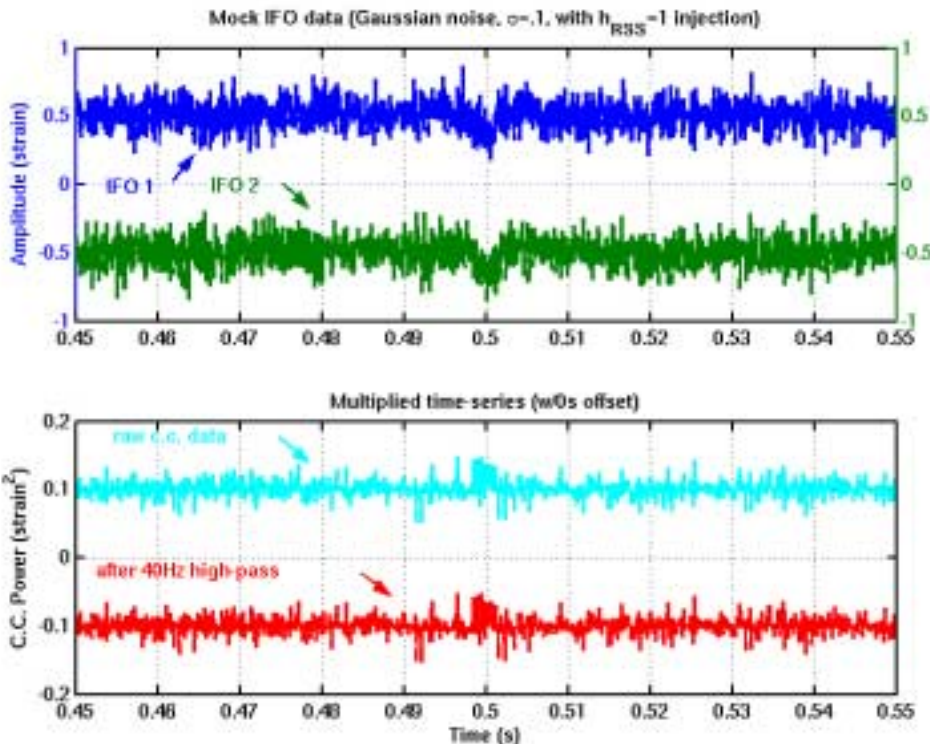
Dimmelmeier-Font-Müller SN wfvrn A1B1G1



Ott et. al. SN wfvrn ww-s15a1000β0.4

Method I: cross-correlation w/ pulse-train mask

- Multiply two IFO timeseries w/ fixed (0?) offset

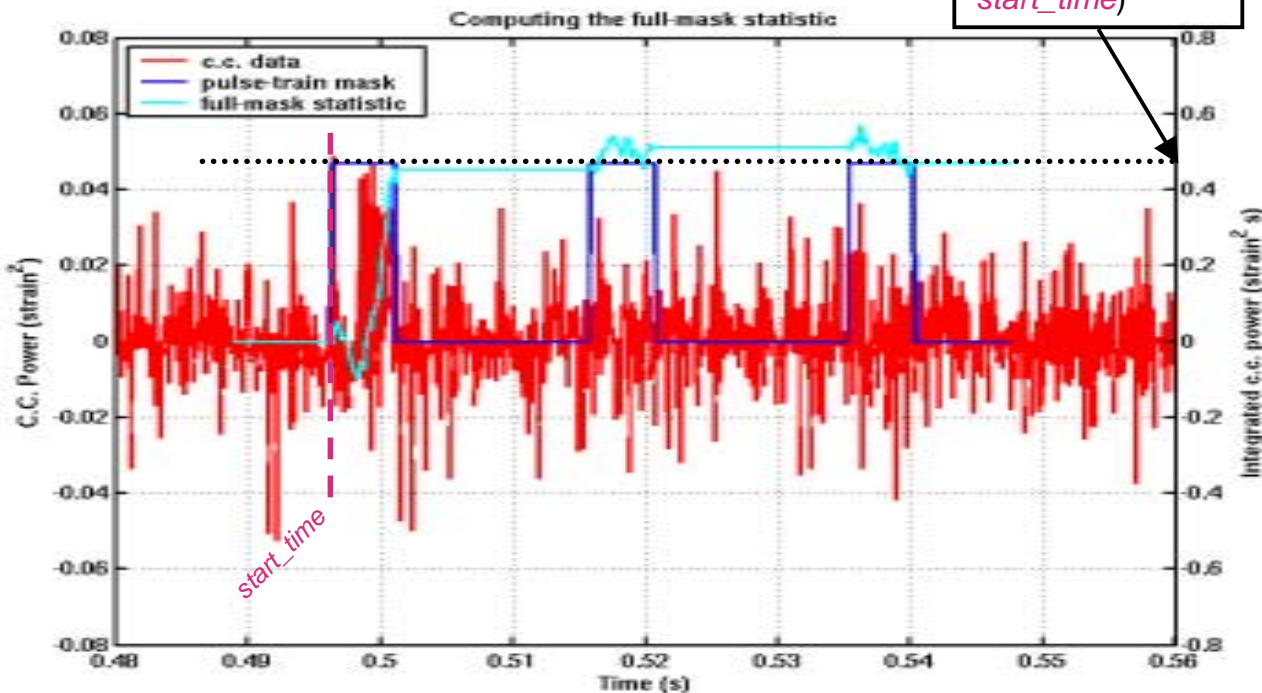


- Construct pulse-train mask:
 - Parameters:
 - » *#_pulses*
 - » *pulse_width*
 - » *pulse_spacing*
 - » *start_time* (scanned)

Method II: piece-meal integration

- Integrate cross-correlated timeseries over all pulses
 - Note: Do not integrate between pulses

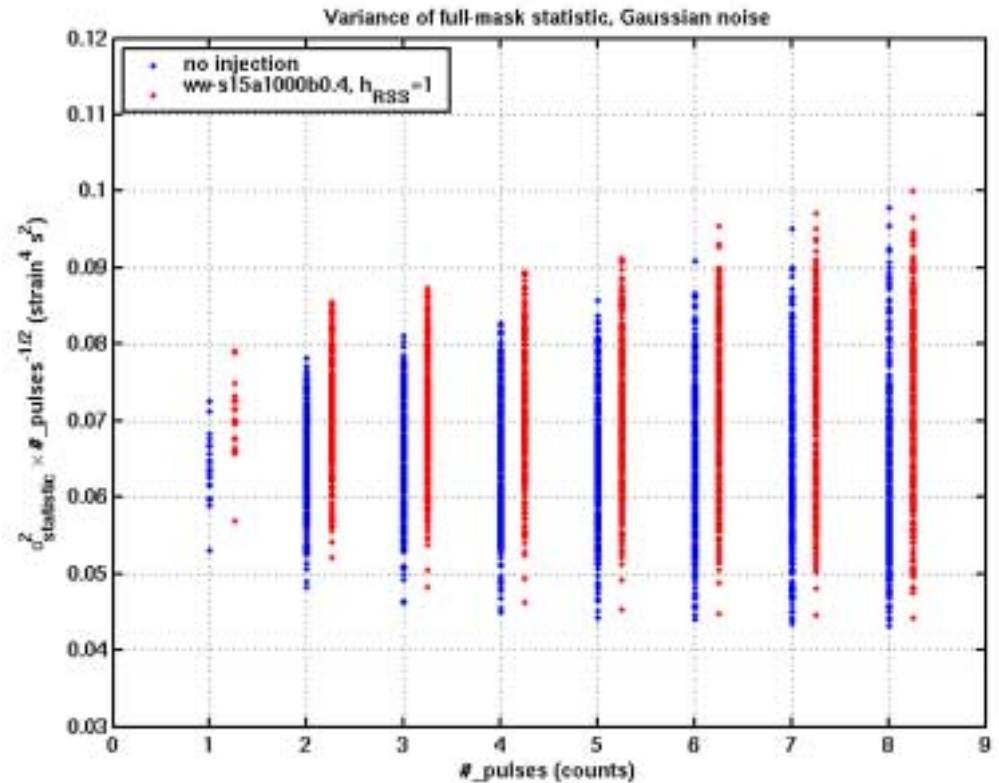
value of 's' for parameter choice
(#_pulses, pulse_width, pulse_spacing, start_time)



- » This is the 'full-mask' statistic (s)
- » Can also construct 'inverse-mask', 'single-pulse', and 'ratio' statistics
- » Computed for all *start_time* parameters
- » Is randomly scattered about 0 w/ only noise
- » When a signal is present in both IFOs, statistic leans slightly positive.
- » Sensitive to non-zero mean in data ($|s|$ increases with *pulse-width* and *#_pulses*)
- » Aggressive, zero-phase high-pass filter improves this

Method III: Constructing SNR

- Assume $\mu_s = 0$
- Variance $\sigma_s^2 \sim \sqrt{(\#_pulses)}$
 » $SNR = s / \sqrt{(\#_pulses)}$
- Can use off-source segments to set nominal background level
- Choice of parameters has little effect (so far)



SNR behavior

- Parameter choices:
 - » *#_pulses*: 3
 - » *pulse-width*: 5ms
 - » *pulse-spacing*: 15ms

