Optimal Filtering Supernovae Event Search: Current Status

Search Code:

- LAL based code
  (build based on Ringdown Search Code in the LAL/LALAPPS)

- Testing, bug fixing and tuning in progress
  (Segment size, highpass frequency, SNR threshold)

Templates:

- Require adjustments on the simulated waveforms to use them as templates since none of the waveforms starts and ends with zero amplitude

- Smooth beginning using exponential decay, and ending utilizing Bézier curve
Search Code

\[ z(t) = 4 \int_{0}^{\infty} \tilde{h}(f) \tilde{s}^*(f) e^{2\pi i ft} df \]

- Use hanning for average noise power
- No windowing for numerator part of the matched filter

**Matched Filter Output**

- Search segment overlapping 50%
- Scan events only on the middle part of a search segment since no windowing in the numerator
- Ignore 1/4 of matched filter output at front and end of a segment
Template Conditioning : An Example

Waveform : s11A1000B0.5

- Not all the waveforms start and end with zero amplitude
- Require conditioning to minimize leakage
- Apply exponential decay at the beginning, and Bézier curve at the end of the waveform to smooth out

Spectrum : s11A1000B0.5

- Not all the waveforms start and end with zero amplitude
- Require conditioning to minimize leakage
- Apply exponential decay at the beginning, and Bézier curve at the end of the waveform to smooth out