UT-Brownsville

1. University:

    10,000 students
    Part of UT system (1992)
    Hispanic serving institution

2. Department:

    3 faculty (2 relativists)
    Bachelor's in Physics
    Master's degree with UTEP

3. Resources:

    Hardware: SGI Workstations
    Software: Mathematica, MATLAB, ...
    NASA grant: release time, ...

4. Possibilities for growth:

    University is expanding
    NSF-funded grants for MSI
    Administrative commitment

Past Projects

1. **Stochastic gravity-wave detection:**
   (with B. Allen)

   Idea: Calculate key quantities (e.g., optimal filters, snrs, ...) for 5 major interferometers.

   CC statistic implemented in GRASP.

   Corrected error in literature for $\Omega_{gw}^{90\%}$.

   Combine data from different detector pairs, ...

2. **GWs associated gamma ray bursts:**
   (with S. Finn, S. Mohanty)

   Idea: Indirectly detect GWs by comparing "on" and "off" distributions.

   Upper limit on amplitude of GWs comparable to that using MF.

   Advantage: No detailed knowledge of waveform required.

Current/Future Projects

1. **Maximum-likelihood vs. CC statistic:** (with S. Finn)

   Idea: Compare false dismissal vs. false alarm curves for each statistic.

   Monte Carlo simulations for uncorrelated, white, Gaussian noise.

   Preliminary results show ML better.

2. **Robust statistic for non-Gaussian noise:** (with B. Allen, J. Creighton, E. Flanagan)

   Idea: Zero data above breakpoint in non-Gaussian noise distibution.

   Derivation for coincident, coaligned detectors with uncorrelated, white, mixture-Gaussian noise.

   Monte Carlo simulations.

   Extend to separated detectors and colored noise.

Current/Future Projects - (cont.)

3. **GWs in close-limit approximation:**
   (M. Diaz and J. Pullin)

   Idea: Late stages of head-on collision of 2 BHs as perturbation of Schwarzschild.

   Solve wave equation for Zerilli function.

   Find metric perturbations in terms of Zerilli; calculate expected snr.

   Extend to boosted holes, non-head-on collision, ...

4. **SB from deterministic sources:**
   (with S. Finn)

   Idea: SB as confusion-limit of discrete, unresolved sources.

   Calculate PSDs for different sources.

   Construct appropriate statistic.

   What to do when signal is not Gaussian??