Detectability of Gravitational Waves From Circular Binaries With Misaligned Spins

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Can we detect BH-BH binaries with substantial misaligned spins with templates where spin effects have been ignored? What is the [redacted] Fitting factor for this case?

- LIGOI noise curve
- effect of spins on the phasing ignored
- 2PN signal and template (ignoring spin dependent phase terms)

LIGO-G010141-00-Z

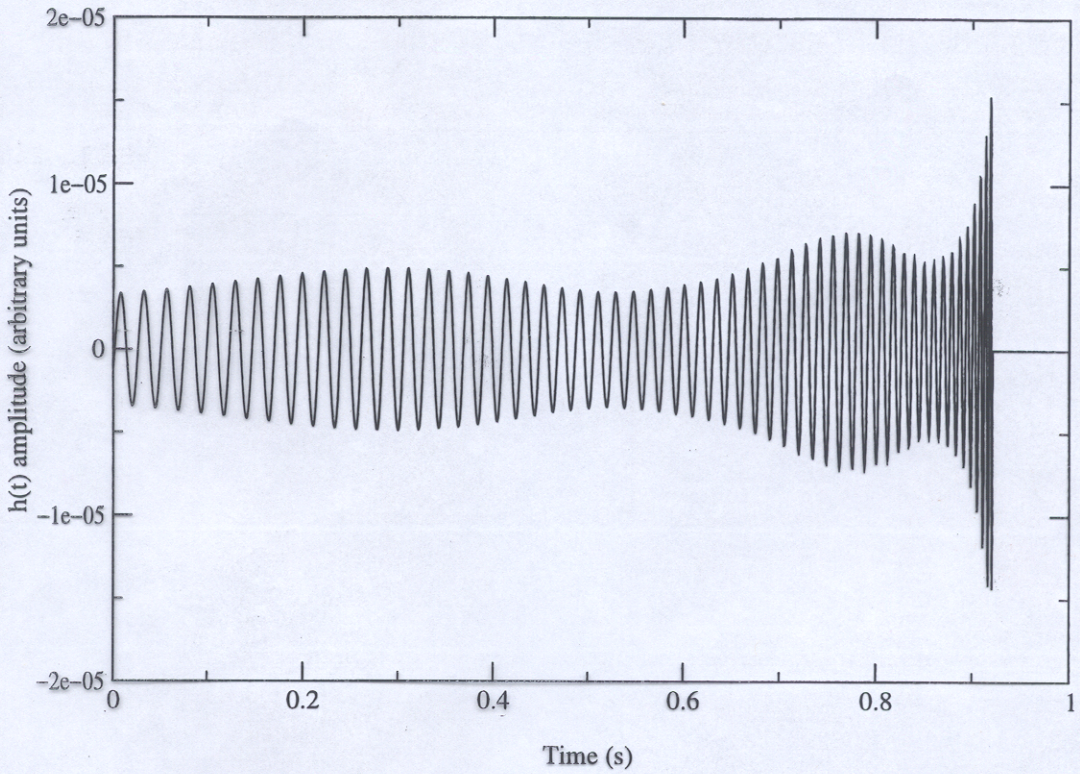

Figure 1: The gravitational wave signal produced by an $M_1 = M_2 = 10M_\odot$ binary. $\mathbf{S_1}$ is aligned at angles $\alpha_1 = 0$, $\beta_1 = 0$, and $\mathbf{S_2}$ is aligned at angles $\alpha_2 = \frac{4\pi}{10}$, $\beta_2 = \frac{\pi}{4}$.

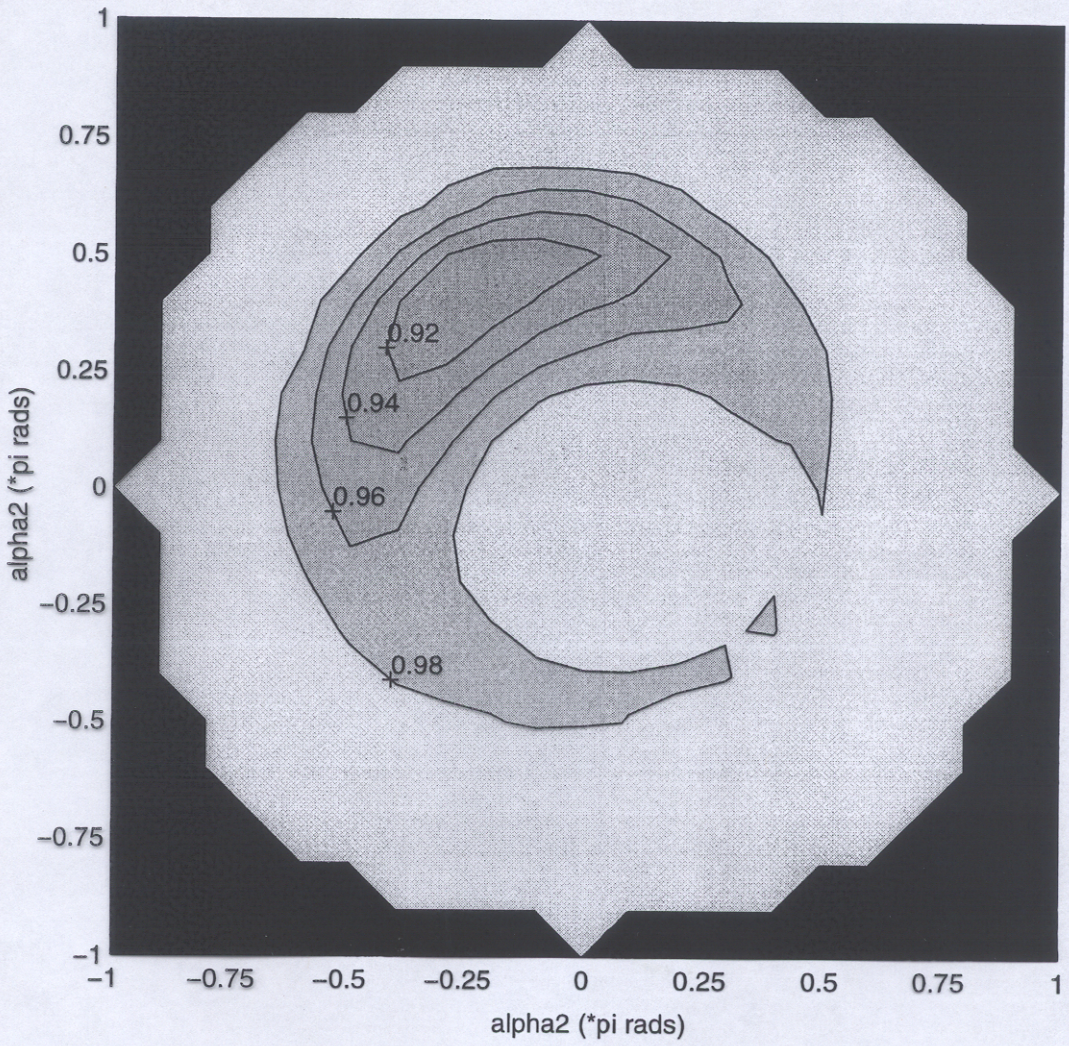

Figure 3: Contours of equal fitting factors for the full range of angles α_2 and β_2, when $\alpha_1 = 0$ and $\beta_1 = 0$.

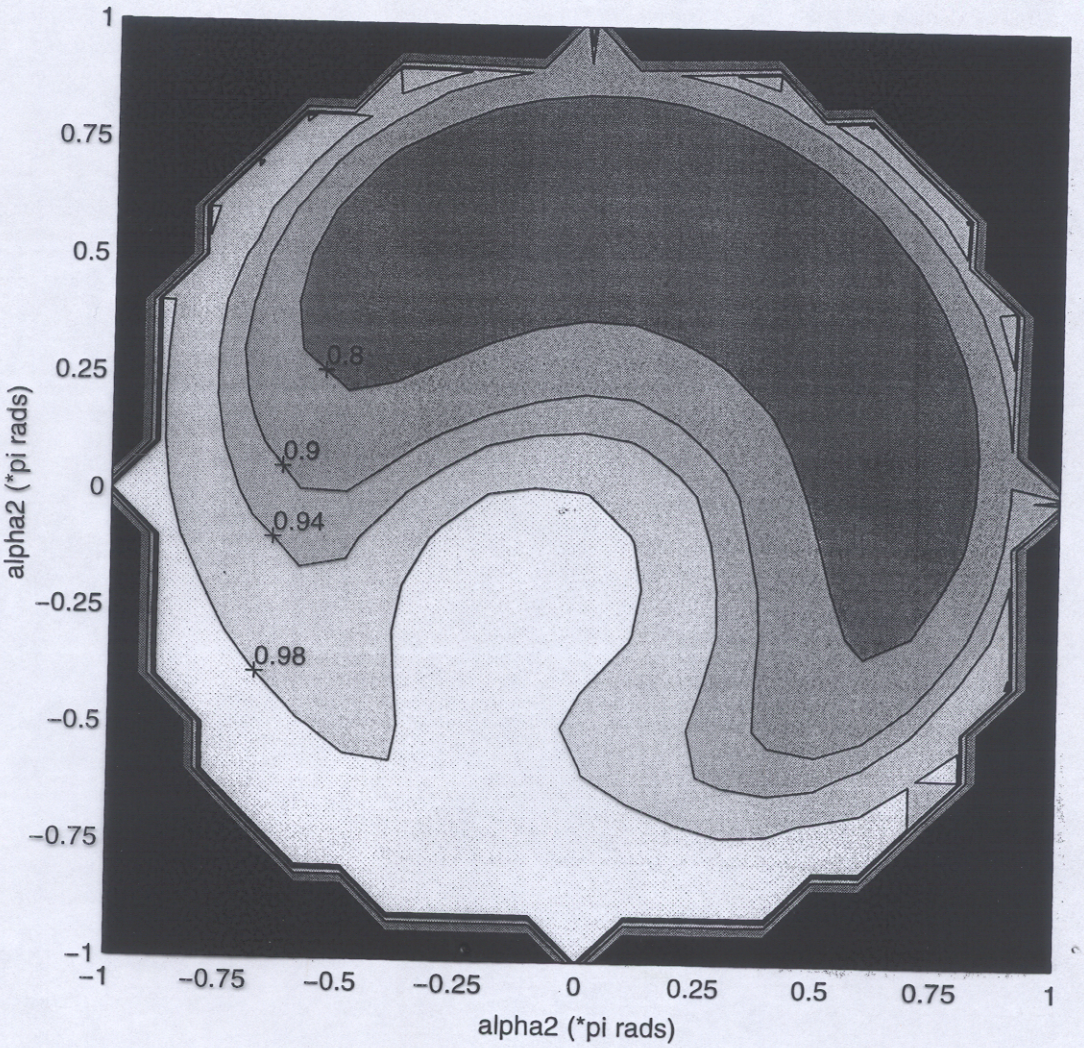

Figure 4: Contours of equal fitting factors for the full range of angles α_2 and β_2, when $\alpha_1 = 0.955$ and $\beta_1 = \pi/4$.