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Effect of Black Hole Spins on Christodoulou Memory in Binary Mergers and its implication on Observing Gravitational Wave Bursts With Memory in Pulsar Timing Array ASHOK CHOUDHARY, SEAN T. MCWILLIAMS, West Virginia Univ — The Christodoulou memory, which is a non-linear memory effect sourced by the oscillatory component of the gravitational wave stress tensor, produces a growing, nonoscillatory change in the gravitational wave strain. This results in the permanent displacement of a pair of freely falling test masses after the gravitational wave has passed. Merger of supermassive black holes is a powerful source of gravitational wave with Chritodoulou memory effect. This effect can be potentially seen in pulsar timing observations. Initiatives to observe Burst with memory signal have assumed the signal to be a step function of a given amplitude, which is valid in situations like supernova explosion. But events like merger of supermassive black holes happens on the time scale of few days depending upon the mass. We investigate how the effect of Spin changes the timing residuals over a two weeks period of interval. We find that when the burst with memory(BWM) signals are not assumed to be a step function and replaced with the actual memory growth functions can significantly chage the expected results. Our results shows that spin contribution plays an important role while computing the residuals.

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