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Memory-triggered supernova neutrino detection

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When a burst of neutrinos from a core-collapse supernova (CCSN) passes by the Earth, it causes a permanent change in the local space-time metric, called the gravitational wave (GW) memory. Long considered unobservable, this effect will be detectable in the near future, at deci-Hertz GW interferometers. I will present a novel idea, where observations of the neutrino GW memory from CCSNe will enable time-triggered searches of supernova neutrinos at megaton (Mt) scale detectors. This combination of a deci-Hz GW detector and a Mt neutrino detector will allow the latter to surpass its current sensitivity limits to detect a nearly background-free sample of ˜ 3 - 30 supernova neutrino events per Mt per decade of operation, from large distances (˜ 10 - 100 Mpc), which will open a new avenue to studying supernova neutrinos.

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