LISA or a LISA-like mission would provide a generic test on a class of models which modify gravity in order to explain galactic and galactic cluster structures without the need for dark matter. These models are known as "dark matter emulators" and they include TeVeS [1] and SVTG [2]. In these models the enhanced force of gravity needed to explain cosmic motions without dark matter is mediated by scalar and vector fields which couple to ordinary matter but not to linearized gravity waves. Hence the Shapiro delay for gravity waves from a cosmic source differs in a predictable way from the delay for light and/or neutrinos [3, 4]. A famous result due to Moore and Nelson shows that the gravity wave pulse must arrive first [5]. The time lag grows with increasing distance, and direct computation gives delays ranging from five days for Sco-X1 to over two years for sources in the Andromeda galaxy [4]. It is important to note that a even SINGLE gravitational wave detection which is coincident with either an optical or nuetrino signature would rule out these models. On the other hand, detecting the gravity wave pulse before a recognized optical or neutrino pulse would confirm them. There is no comparably sensitive or generic test.

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