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Dark matter phase transitions and gravitational waves

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A rather minimal possibility is that dark matter consists of the gauge bosons of a spontaneously broken symmetry. I will discuss the possibility of detecting the gravitational waves produced by the phase transition associated with such breaking. Concretely, I will focus on the scenario based on an $U(1)_D$ group and argue that it is a case study for the sensitivity of future gravitational wave observatories to phase transitions associated with dark matter. This is because there are few parameters and those fixing the relic density also determine the effective potential establishing the strength of the phase transition. Particularly promising for LISA is the super-cool dark matter regime, with DM masses above 100 TeV, for which the gravitational wave signal is notably strong

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