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Testing Affleck Dine with Poltergeist Gravitational Waves

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The Affleck Dine mechanism is a compelling explanation for the asymmetry between matter and anti-matter. Unfortunately, testing the mechanism is quite a challenge due to the high scales involved. We will argue that the Affleck-Dine condensate usually produces long lived Q-balls that cause an early period of matter domination. Because these Q-balls decay at a rate faster than exponential, they will produce sound waves in the plasma that enhance gravitational waves from inflation at a frequency that corresponds to the time of decay. The production of observable signals is very common, and the mechanisms that can produce a sufficiently fast transition from matter to radiation domination are limited. This implies a relatively generic test of the mechanism

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