

## Increasing signal for Pulsar timing by two types of ultralight scalar axions

Pulsar timing array is an effective method to detect low-frequency gravitational waves. Khmelnitsky and Rubakov (2013) have proved that the oscillations in the arrival time could also be induced by the oscillations in pressure of ultralight scalar dark matter with mass around  $10^{-22}$ . However, for simplicity, only one type of dark matter was taken into account. In this presentation, we consider the situation of two types dark matter using the same method with an expectation that the signal can be significantly improved. Additionally, we also discuss the possibility of generating dark energy from the potential of two axion fields.

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