## Particle Physics on the Plains 2024



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## **Multi-messenger Approach to Ultra-light Scalars**

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We propose a novel method to study the ultra-light scalars, where compact rotating objects undergo the phenomenon of superradiance to create gravitational waves and neutrino flux signals. The neutrino flux results from the 'right' coupling between the ultra-light scalars and the neutrinos. We study the intertwining of gravitational waves and neutrino flux signals produced from a single source and elaborate if and when the signals can be detected in existing and upcoming experiments in a direct manner. We also discuss an indirect way to test it by means of cosmic neutrino background which can be detected by upcoming PTOLEMY experiment.

**Authors:** Mr BANERJEE, Indra Kumar (Indian Institute of Science Education and Research, Berhampur); BON-THU, Soumya (Oklahoma State University); Dr DEY, Ujjal Kumar (Indian Institute of Science Education and Research, Berhampur)

**Presenter:** BONTHU, Soumya (Oklahoma State University)

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