Contribution ID: **17** Type: **not specified**

Axion and Gravitational Waves from Black Hole Superradiance

Thursday, 20 February 2020 16:30 (30 minutes)

Theories beyond the Standard Model of particle physics often predict new, light, feebly interacting particles whose discovery requires novel search strategies. A light particle, the QCD axion, elegantly solves the outstanding strong-CP problem of the Standard Model; cousins of the QCD axion can also appear, and are natural dark matter candidates. I will show how rotating black holes turn into axionic and gravitational wave beacons, creating nature's laboratories for ultralight bosons. When an axion's Compton wavelength is comparable to a black hole size, energy and angular momentum from the black hole source exponentially-growing bound states of particles, forming gravitational atoms'. Thesegravitational atoms' emit monochromatic gravitational wave signals, enabling gravitational wave observatories to discover ultralight axions. If the axions interact with one another, instead of gravitational waves, black holes populate the universe with axion waves.

Presenter: BARYAKHTAR, Masha (NYU)

Session Classification: Evening session