Measurements of baryon-antibaryon and meson-antimeson pairs from QED vacuum excitation in Au+Au ultra-peripheral collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV from STAR

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Relativistic heavy-ion collisions generate extremely strong electromagnetic fields, providing an ideal environment to study the electromagnetic excitation of the vacuum. Furthermore, the electromagnetic fields are sensitive to the charge distributions of the colliding nuclei which can be used to study the nuclear structure. The Breit-Wheeler process, the lowest-order decay mode of the QED vacuum excitation into electron-positron pairs, has been experimentally verified by the STAR collaboration, stimulating further investigations of higher-order decay modes, such as baryon-antibaryon and meson-antimeson pairs.

This presentation reports on the new measurements of baryon-antibaryon and meson-antimeson pairs from QED vacuum excitation in Au+Au ultra-peripheral collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV by the STAR experiment. The invariant mass and p_{T} distributions for the pair production will be shown, and the azimuthal angular modulation caused by the polarization of the electromagnetic field will be discussed. These measurements will shed new lights on the understanding of the QED vacuum and nuclear structure.