Measurements of the Collision Energy Dependence of the Polarized $\gamma\gamma \to e^+e^-$ Process in Peripheral Au+Au Collisions with the STAR Detector

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In ultra-relativistic heavy-ion collisions, strong electromagnetic fields arising from the Lorentz-contracted, highly charged nuclei can be approximated as a large flux of high-energy quasi-real photons. It has recently been realized that even in peripheral collisions, the dielectron production at very low transverse momentum (p_T) still originates mainly from the two-photon interactions. Measurements of the polarized $\gamma\gamma \to e^+e^-$ process in peripheral collisions provide an opportunity to directly test its collision energy and impact parameter dependences, which is sensitive to the infrared divergence of the photon flux.

In this presentation, we will present the STAR measurements of energy and impact parameter dependence of electron pair mean p_T and cross section from polarized $\gamma\gamma \to e^+e^-$ process in peripheral Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 54.4$ GeV and $\sqrt{s_{\mathrm{NN}}} = 200$ GeV. Furthermore, the 4th-order angular modulation, predicted for collisions of linearly-polarized photons, will be presented. The physics implications of these results will be discussed together with model comparisons.