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The anisotropic flow of thermal photons in most-central α-clustered C+Au collisions at 200A GeV

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The light nuclei such as B, C, O etc. can occur in different stable α-clustered states, as found in the low-energy nuclear structure studies. Recent phenomenological findings suggest that such light nuclei with different exotic shapes can produce large initial-state anisotropies in relativistic nuclear collisions. The electromagnetic radiations, being sensitive to the initial dynamics, are expected to be affected by the initial clustered structures significantly. In this work, we estimate the production and anisotropic flow of photons from most-central collisions of triangular α- clustered carbon and gold at $\sqrt{s_{NN}}$ =200 GeV at RHIC using an event-by-event hydrodynamic framework and compare the results with those obtained from unclustered carbon and gold collisions. We find that the thermal photon v_3 for most central collisions is significantly large for the clustered case compared to the case with unclustered carbon. In contrast, the elliptic flow parameter (v_2) is found to be similar for the two cases. We show that the ratio of anisotropic flow coefficients can be a potential observable to detect the α-clustered structure in the carbon nucleus.

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