D^0-meson elliptic flow using event-shape-engineering technique in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV from STAR

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Because of their early production, charm quarks are sensitive to the entire evolution of the system created in ultra-relativistic collisions of heavy ions. In particular, charm quark elliptic flow (v_2) is a valuable tool to study of charm transport in the quark-gluon plasma (QGP). Results from the STAR experiment show that D^0-mesons develop large v_2 values, comparable to those of light flavor hadrons, in Au+Au collisions at the top RHIC energy. Recently, measurements of the correlation between low p_T light flavor and charm hadron v_2 is proposed as a sensitive observable to distinguish between different energy loss models for charm quarks in the QGP and gain further insights into the development of large v_2 values for charm hadrons.

In this talk, we will present the D^0-meson v_2 measurement with the event-shape-engineering technique applied in Au+Au collisions at $\sqrt{s_{\rm NN}} = 200$ GeV by the STAR experiment. The measurement utilizes the STAR Heavy Flavor Tracker and the combined datasets recorded during RHIC 2014 and 2016 runs. The D^0 v_2 will be reported as a function of the reduced flow vector q_2 and v_2 of light flavor hadrons. Furthermore, we also show results utilizing the Forward Meson Spectrometer covering the range of $2.5 < \eta < 4$ for event plane reconstruction, which helps to reduce the non-flow contribution to the D^0 v_2 measurements. These results will be compared to model calculations and physics implications on the charm quark dynamics in the QGP will be discussed.