# $D^0$-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 for study of charm transport in the quark-gluon plasma (QGP). Recent results from the STAR experiment show that in 10-40% central Au+Au collisions at the top RHIC energy the $D^0$-meson $v_2$ follows the Number-of-Constituent-Quark(NCQ) scaling similarly as light-flavor hadrons. To gain more insight into the charm quark dynamics it is of interest to study their flow in events with different initial conditions.

In this poster, we will present $D^0$-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 + 2016 runs. $D^0$ $v_2$ will be reported as a function of the reduced flow vector $q_2$ and compared to that of light-flavor and strange hadrons. Furthermore, we utilize the Forward Meson Spectrometer (FMS) detector covering the range of $2.5 < \eta < 4$. The large $\eta$-gap helps to reduce the non-flow contribution in the $D^0$ $v_2$ measurement. These results will be compared to model calculations and physics implications on the charm quark diffusion coefficient will be discussed.