
Contribution ID: **319** Type: **Poster**

# Anomalous dilepton production as precursory phenomena of color superconductivity

*Tuesday 7 September 2021 11:18 (1 minute)*

One of the key ingredients in hadron physics based on QCD is the notion of diquark correlations, which in turn could lead to the color superconductivity (CSC) in dense and cold quark matter with a Fermi surface to be realized in a compact star.
One of the main focuses of recent experiments using heavy-ion collision is to reveal possible rich physics in high baryon-density matter at relatively low temperature: Such experiments include the beam-energy scan program at RHIC, and HADES and NA61/SHINE collaborations as well as those to be performed in future experimental facilities such as FAIR, NICA and J-PARC-HI.
In the present report, we show that the diquark correlations or pair fluctuations of the two-flavor superconductivity (2SC) near but above the critical temperature make a well-defined collective soft modes, which may be experimentally confirmed through an anomalous enhancement of the dilepton production rate.
Indeed, on the basis of the two-flavor NJL model, we shall demonstrate that Aslamazov-Larkin term due to the soft modes, which is known to give rise to anomalous excess of electric conductivity in metals, modify the photon self-energy so greatly that the dilepton production rates is enhanced anomalously at the low energy region.

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**Session Classification:** Poster Session I

**Track Classification:** Hot and dense matter physics - QGP and heavy ion collisions