**First principle calculation of dilepton production rate in strongly interacting QGP**

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**Motivation**

Dilepton production at PHENIX shows an enhancement at low energy.

**Strategy**

- **Lattice**
  - 2-pole quark spectral function obtained by quenched QCD.
  - Slab model
  - Normal
  - Plasma

- **Virtual photon emission**
  - Quasi-particle pair annihilation
  - Landau damping

- **Vertex**
  - Propagator determines vertexes by Ward-Takahashi identity and isotropy

**Results**

- **Dilepton production rate**
  - Our Result
  - T=3Tc
  - Tc=290 MeV
  - m_0=0.744T
  - \( q_0 \): Dilepton invariant mass
  - Large than HTL result
  - Similar result for 1.5Tc

- **Enhancement around 1.5m_0** is caused by Landau damping.
- Recattering of thermally excited quasi-particles enhance dilepton production rate.
- 2 divergence comes from van Hove singularity.
- Plasmino density of states and density of integrated states diverse.

**Summary**

- We calculated dilepton production rate from static QGP using the quark propagator obtained in quenched lattice QCD and SDE.
- Production rate enhanced for \( q_0 = 300 \sim 600 \) MeV. \( \Rightarrow \) origin of the large enhancement reported at RHIC by PHENIX group?
- Future: dilepton production "yield" from QGP using these data.