



Contribution ID: 39

Type: **Poster Presentation**

## Measurement of $K^{*0,\pm}$ in Au+Au Collisions at RHIC BES-II

Tuesday, 24 March 2026 18:41 (1 minute)

Isospin symmetry, a fundamental feature of the strong interaction, predicts similar production rates of charged and neutral kaons in high-energy collisions. However, recent measurements by NA61/SHINE indicate an excess production of charged over neutral kaons, suggesting significant isospin symmetry breaking that challenges the expectation, and the underlying origin of this effect remains unresolved [1]. Such deviations could arise from Landau-level splitting under intense magnetic fields, which can lift the degeneracy between hadrons containing up and down quarks [2]. The study of neutral and charged vector mesons in heavy-ion collisions may serve as a probe for possible isospin symmetry-breaking mechanisms triggered by strong magnetic fields in QCD matter. A notable example is the  $K^{*0}(d\bar{s})$  and  $K^{*\pm}(u\bar{s})$  pair, which share the same isospin but have quarks with magnetic moments differing by nearly a factor of five.

In this poster, we present precise measurements of the transverse momentum ( $p_T$ ) spectra,  $p_T$ -integrated yields ( $dN/dy$ ), and average transverse momentum ( $\langle p_T \rangle$ ) of  $K^{*0,\pm}$  at mid-rapidity in Au+Au collisions at  $\sqrt{s_{NN}} = 7.7 - 27$  GeV, using data from the STAR Beam Energy Scan II (BES-II) program at RHIC. Centrality- and  $p_T$ -dependent yield ratios, such as  $K^{*\pm}/K^{*0}$  and  $K^*/K$ , will be used to assess the medium effects and possible isospin-violating trends.

### References

- [1] NA61/SHINE Collaboration, G. Giacosa et al., "Evidence of isospin-symmetry violation in high-energy collisions of atomic nuclei", *Nat Commun* 16, 2849 (2025).
- [2] K. Xu et al., "Extracting the magnitude of magnetic field at freeze-out in heavy-ion collisions", *Phys. Lett. B* 809, 135706 (2020).

**Author:** Mr BARIK, Pranjal (Indian Institute of Science Education and Research (IISER) Berhampur)

**Presenter:** Mr BARIK, Pranjal (Indian Institute of Science Education and Research (IISER) Berhampur)

**Session Classification:** Poster Session