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A Bayesian inference of chromomagneto fraction in the strong interaction medium

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The chromomagneto monopoles, an excitation of the non-Abelian gauge field that carries chromomagnetic charge, are believed to be important in explaining confinement in vacuum and the strong coupling nature around the confinement-deconfinement transition temperature (T_c). The chromomagneto monopoles have been found to be a solution to the long-standing puzzle that one cannot simultaneously describe the experimental results of the nuclear modification factor ($R_{\rm AA}$) and elliptic flow (v_2) of high-energy particles. Yet, the fraction of chromomagneto monopoles is not precisely known from a theoretical perspective, and we extract its temperature-dependent fraction using Bayesian inference in this work. Our analysis, based on the \textsc{cujet3.1} modeling of the energetic hadrons' $R_{\rm AA}$ and v_2, indicates that the chromomagneto monopole is a significant constituent of the strongly interacting medium near T_c, and its contribution remains non-negligible at high temperatures $T \sim 3\,T_c$. With the extracted chromomagneto fraction, our model yields good agreement with not only the experimental data for energetic hadrons, but also with the state-of-the-art knowledge of the heavy flavor diffusion parameter and the ratio between shear viscosity and entropy.

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