



**UNIVERSITÄT  
BIELEFELD**

Fakultät für Physik

# Sabarnya Mitra

Indian Institute of Science

## A new way to resum QCD at a finite chemical potential

The all-ordered exponential resummation of the first  $N$  derivatives of the Taylor expansion suffers from the appearance of formalism-induced bias estimates of these derivatives. Without being careful, bias could easily be mistaken for higher-order contributions, for which, bias needs to be diagnosed and subtracted first, in order to identify genuine higher-order contributions. This can lead to possibly wrong conclusions regarding behavior and estimates of different thermodynamic observables which are crucial in uncovering the QCD phase diagram. We show how we avert this problem to some extent using cumulant expansion of the resummed formula. We perform this for isospin and baryon chemical potentials. Later, we demonstrate how the new formalism of an unbiased (strictly speaking, partially) exponential resummation successfully reproduces the unbiased cumulant expansion up to the desired order in  $\mu$  along with higher order contributions.

**Tuesday, 2 August 2022,  
15:00 in D6-135  
[www.physik.uni-bielefeld.de](http://www.physik.uni-bielefeld.de)**