Search for the QCD critical point through the rapidity dependence of cumulants JASMINE BREWER, Massachusetts Inst of Tech-MIT, SWAGATO MUKHERJEE, Brookhaven National Laboratory, KRISHNA RAJAGOPAL, YI YIN, Massachusetts Inst of Tech-MIT — In the coming Beam Energy Scan, RHIC will have much higher luminosity at $\sqrt{s} = 20$ GeV than it will at $\sqrt{s} = 10$ GeV and below. With the STAR iTPC upgrade in place they will be able to reach proton rapidities up to $|y| \sim 0.8$ where the baryon chemical potential μ_B in $\sqrt{s} = 20$ GeV collisions is somewhat higher than at mid-rapidity. They may therefore be able to use the high statistics at this and nearby collision energies to vary μ_B somewhat by varying y, as well as by scanning down to the lowest possible collision energies. By employing Ising universality together with a phenomenologically motivated freeze-out prescription, we demonstrate that the rapidity dependence of Gaussian and non-Gaussian cumulants is sensitive to the presence of the critical point and exhibits a characteristic pattern as indicated by critical universality. If there is a critical point to be found in the regime that RHIC will explore, we propose the rapidity dependence of cumulants as a complementary route to finding signs of its presence. In particular, it is quite plausible that the rapiditydependence of cumulants will change qualitatively if one passes the critical point during the RHIC beam energy scan.

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