Sonification of lattice data: the spectrum of the Dirac operator across the deconfinement transition

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Abstract: Sonification is the use of non-speech audio to extract information from data. It represents the analogue to graphical visualization. The method is applied in several disciplines from economy to medicine to physics. Sonification might also help in the analyzation process of lattice data. It could assist together with graphical display to examine the behavior of lattice observables as a function of parameters like gauge coupling, quark mass, etc. It might further be used to point out unique characteristics of a single gauge field configurations out of many. In order to demonstrate the methodology for QCD we analayze the eigenvalues of the Dirac operator from the confinement to the deconfinement phase. We are adapting a GUI for audio browsing of baryon spectra from quark models written at the University of Graz within the interdisciplinary research project SonEnvir.