

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Listening to the horseshoe vortex system: interpretation of turbulent coherent structures by Parameter Mapping Sonification JUAN-PABLO CACERES, Stanford University, Pontificia Universidad Catolica de Chile, CRISTIAN ESCAURIAZA, Pontificia Universidad Catolica de Chile — The adverse pressure gradient induced by a surface-mounted obstacle in a turbulent boundary layer causes the formation the dynamically rich horseshoe vortex system around the body. Recent studies have identified the complex mechanisms responsible for the dynamics of the vortices and the emergence of bimodal histograms of velocity fluctuations in the junction region. To understand the dynamic relation of the multiple vortices, we convert streamwise velocity time-series at the symmetry plane into sound by Parameter Mapping Sonification, to make emerge aspects of the rich-dynamics of the turbulent coherent structures in the vortex system that may not have been uncovered by traditional methods. Through this development we provide insights on the analysis of turbulent flows dominated by the quasi-periodic interaction of large-scale coherent vortices.

Cristian Escauriaza
Pontificia Universidad Catolica de Chile

Date submitted: 31 Jul 2012

Electronic form version 1.4