

Abstract Submitted  
for the DFD20 Meeting of  
The American Physical Society

**Analysis of Flow Regime and Pressure Waves in Hyperloop System** KYEONGSIK JANG, GIANGLE THITHANH, Department of Mechanical engineering, Chung-ang University, KWANSUP LEE, YOUNGJUN JANG, Hyper Tube Express (HTX) Research Team, Korea Railroad Research Institute, JAIYOUNG RYU, Department of Mechanical engineering, Chung-ang University — Due to drastic technological advancement, the demand for more efficient and economical means of transportation has increased significantly. In 2013, Elon Musk introduced near-vacuum tube-pod system, Hyperloop system, that travels at the speed of near Mach number 1. This high-speed object in low pressure tube induces pressure waves in tube. For analyzing Hyperloop system, two-dimensional axisymmetric and unsteady simulation with density based solver was performed. As a result, flow regime in Hyperloop system is divided into three types which are similar to converge-diverge nozzle. We also confirmed that pressure waves caused by pod motion greatly affect the aerodynamic characteristics of the pod due to low tube pressure compared with atmosphere. By theoretically analyzing pressure waves, drag acting on the pod was calculated. This theoretical consideration of pressure waves and drag of the pod can contribute to further understanding of Hyperloop system.

Kyeongsik Jang  
Department of Mechanical engineering, Chung-ang University

Date submitted: 03 Aug 2020

Electronic form version 1.4