

Non-Contact Measurement Technique for Horizontal Force Perturbations in Magnetic Levitation Systems

Ryan Druce

Abstract

It is often difficult to accurately measure small forces on large objects, even in laboratory conditions. For example, the support structures for objects undergoing aerodynamic testing generate small drag forces on these objects. The effect of these drag forces can be extremely difficult to quantify. The integration of magnetic levitation technology in aerodynamic testing has been beneficial in reducing the interference of measurements created by these support structures. Despite these advancements, systemic issues in these maglev systems can disrupt the accuracy of aerodynamic measurements. To combat these problems, the paper I'll be presenting in this talk describes a contactless method for measuring small horizontal forces based on current variation in the levitation coil.

Towards the Development of Analytical Tornado-like Models

Lucas Rohl

Abstract

The United States is hit with over 1200 tornadoes nationwide, with most of them occurring in the well-known Tornado-Valley according to National Severe Storms Laboratory. Even after the adoption of doppler radar in the 1990's, we still do not understand these strange, yet beautiful phenomena. The paper I will be presenting in this talk looks at two different models, the Vortex Sink with Axial Flow (VSAF), think of when after you are doing the dishes and how the water flows down the drain, and the Two Fluid model (TFM) which visually you can compare to oil and water in a glass that separate but interact at the boundary or when shaken. This paper is designed to show the limitations and strengths of the VSAF model for how we can further understand tornadoes in the future. Then we will look at 4 different actual tornadoes that have happened and see how they compare to the model. With that, we will be looking at the buoyancy effect and how that plays a part in the development of tornadoes.

Date: Thursday, April 10

Time: 4 - 4:50 pm

Location: Trafton C123