

Abstract Submitted  
for the DFD15 Meeting of  
The American Physical Society

**Diastolic filling in a physical model of obstructive hypertrophic cardiomyopathy** JOSEPH SCHOVANEC, MILAD SAMAEI, HONG KUAN LAI, ARVIND SANTHANAKRISHNAN, Oklahoma State University — Hypertrophic Cardiomyopathy (HCM) is an inherited heart disease that affects as much as one in 500 individuals, and is the most common cause of sudden death in young athletes. The myocardium becomes abnormally thick in HCM and deforms the internal geometry of the left ventricle (LV). Previous studies have shown that a vortex is formed during diastolic filling, and further that the dilated LV morphology seen in systolic heart failure results in altering the filling vortex from elliptical to spherical shape. We have also previously shown that increasing LV wall stiffness decreases the filling vortex circulation. However, alterations to intraventricular filling fluid dynamics due to an obstructive LV morphology and locally elevated wall stiffness (in the hypertrophied region) have not been previously examined from a mechanistic standpoint. We conducted an experimental study using an idealized HCM physical model and compared the intraventricular flow fields obtained from 2D PIV to a baseline LV physical model with lower wall stiffness and anatomical geometry. The obstruction in the HCM model leads to earlier breakdown of the filling vortex as compared to the anatomical LV. Intraventricular filling in both models under increased heart rates will be discussed.

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Date submitted: 01 Aug 2015

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