Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Higher harmonic forces in the flow-induced response of bluff bodies with broken symmetry. YAHYA MODARRES-SADEGHI, University of Massachusetts, Amherst, BANAFSHEH SEYED-AGHAZADEH, Miami University, DANIEL CARLSON, University of Massachusetts, Amherst — A flexibly-mounted uniform cylinder placed in a uniform flow is a canonical configuration for understanding vortex-induced vibration, where the structure is perfectly symmetric with respect to the incoming flow. Several other configurations exist in which the geometrical symmetry of the system is broken, such as an inclined cylinder in which the cylinder is placed with an angle with respect to the incoming flow direction, or a tapered cylinder in which the diameter of the circular cylinder varies along its length, or when the geometry of the cross-section changes from circular to other shapes such as square or triangle. Also, in some other cases, such as a bluff body forced to rotate about its long axis, the symmetry of the surrounding wake is broken by the rotation imposed on the cylinder. Here we focus on flow-induced responses of such systems based on a series of experiments conducted in a recirculating water tunnel. In particular, we discuss how flow forces at frequencies of twice and three times the shedding frequency do exist in the measured cross-flow forces.

Yahya Modarres-Sadeghi
University of Massachusetts, Amherst

Date submitted: 11 Nov 2016 Electronic form version 1.4