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**Setup of a Magnetically Driven Duffing Oscillator to Measure Stochastic Resonance in Undergraduate Physics Labs**<sup>1</sup> LARS HEBENSTIEL, IVAN NOVIKOV, DOUG HARPER, Western Kentucky University — The Duffing Oscillator (DO) is a bistable, nonlinear oscillator initially described by Georg Duffing in 1918. Due to its nonlinear nature, the DO is an excellent system to study stochastic resonance, a phenomenon also occurring in ring lasers, electron paramagnetic resonance and other non-linear systems. Stochastic resonance is a phenomenon whereby a system experiences resonance due to noise being added to it. Optimal stochastic resonance occurs when the optimal amount of noise is added. In this talk, we present the progress in development of a magnetically driven mechanical model of the DO. The design is inspired by the one proposed in *Donoso, Ladera, Eur. J. Phys. 33 (2012)*. The setup is powered by a LabVIEW DAQ system which can be easily controlled by any modern computer. With it, students can experimentally observe phase portraits, poincare maps, bifurcation diagrams, and stochastic resonance. This allows students to familiarize themselves with topics such as chaos, bifurcation and stochastic resonance. This project is funded by the KAS Research Grant, project ID # 23270225.

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Lars Hebenstiel  
Western Kentucky University

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