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**West Coast Swing Dancing as a Driven Harmonic Oscillator**

**Model** DAVON FERRARA<sup>1</sup>, MARIE HOLZER, SHIRLEY KYERE, Belmont University — The study of physics in sports not only provides valuable insight for improved athletic performance and injury prevention, but offers undergraduate students an opportunity to engage in both short- and long-term research efforts. In this project, conducted by two non-physics majors, we hypothesized that a driven harmonic oscillator model can be used to better understand the interaction between two west coast swing dancers since the stiffness of the physical connection between dance partners is a known factor in the dynamics of the dance. The hypothesis was tested by video analysis of two dancers performing a west coast swing basic, the sugar push, while changing the stiffness of the physical connection. The difference in stiffness of the connection from the ideal was estimated by the leader; the position with time data from the video was used to measure changes in the amplitude and phase difference between the leader and follower. While several aspects of our results agree with the proposed model, some key characteristics do not, possibly due to the follower relying on visual leads.

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