Let's Twist Again: The Physics of a Rotational Pendulum

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Rubber bands have many uses in everyday life, but if you hang two metal balls on a twisted rubber band, a surprising physical effect is observed: The balls rotate alternately in both directions. By what aspects is this phenomenon influenced? What influences the period duration and the velocity? We investigated these questions in our project "Let's Twist Again - The Physics of the Rotational Pendulum". For this, we first derived the theory for such a rotational pendulum based on a that of a torsion pendulum. In addition, we derived a theoretical model that describes the effect. We were able to determine the influencing parameters as well as predict the movement of the balls. Additionally, we simulated the phenomenon with a self-written Python program, which allowed for an efficient evaluation. Prediction of period length, velocity, radius and further variables was possible with great accuracy, and we found great similarities to the behavior of a torsion pendulum.