



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Konstantin Y. Batygin	Project Number S1501
Project Title Nonlinear Oscillations in Mechanical Systems	
Abstract Objectives/Goals The subject of the study was a chaotic particle motion initiated by a nonlinear periodic force in a mechanical system. The appearance of chaotic dynamics in simple mechanical systems, is a fundamental classical phenomena. Methods/Materials Non-linear oscillations were simulated through computer modeling. The computer model was realized as a sequence of matrix multiplication. Each matrix describes linear and non-linear oscillations of a mechanical body under external forces. Results The result of the matrix multiplication was a chaotic motion performed by a particle in the presence of linear and non-linear forces. Conclusions/Discussion This type of particle action is called the "beam-beam effect." It is one of the main reasons that limits the intensity of a particle collider.	
Summary Statement The subject of the project is the study of particle motion inside a collider under external linear and nonlinear forces.	
Help Received	