

Large-Scale Numerical Investigations into the Dynamics of Nonlinear Classical Systems

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Outline

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Numerical simulations

Conclusions

Acknowledgements

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- All numerical simulations were performed on the computing cluster of Department of Computational Physics and Information Technologies, “Horia Hulubei” National Institute for Physics and Nuclear Engineering.

Introduction

The model

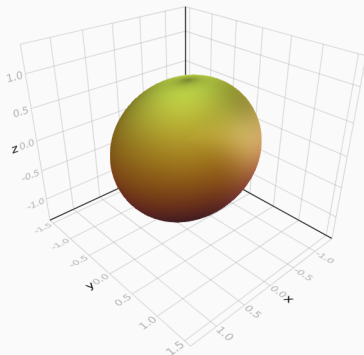
- The physical system that we model is the surface of heavy nuclei.
- The Hamiltonian describes the constrained motion of the vibrational quadrupole degrees of freedom of nuclear surface.

The model

The Hamiltonian of the system

$$H = \frac{A}{2} (p_0^2 + p_2^2) + \frac{A}{2} (q_0^2 + q_2^2) + \frac{B}{\sqrt{2}} q_0 (3q_2^2 - q_0^2) + \frac{D}{4} (q_0^2 + q_2^2)^2$$

- Harmonic oscillator part
- Integrable part
- Non-integrable term

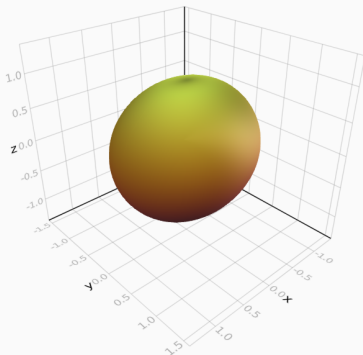


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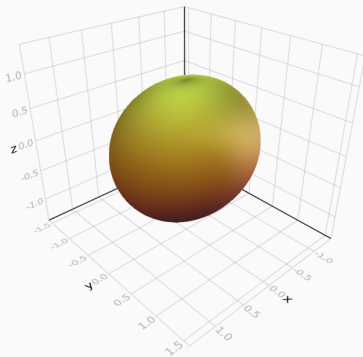


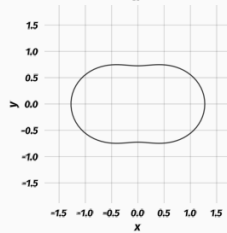
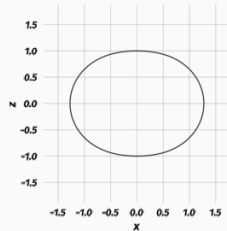
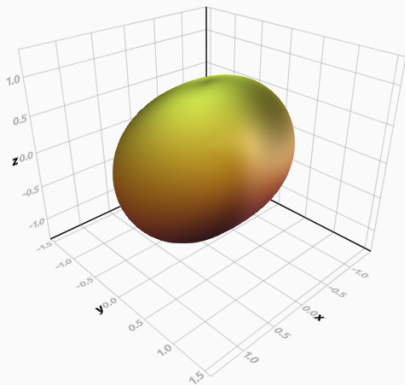
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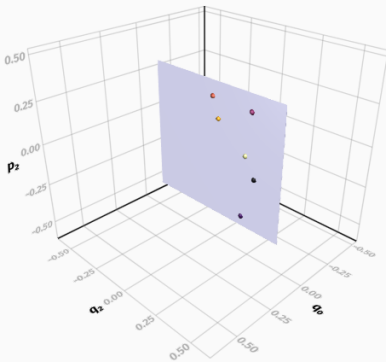
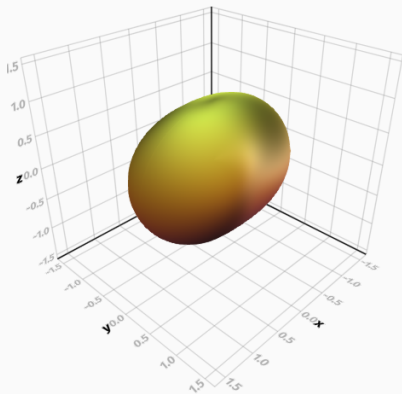
The Hamiltonian of the system

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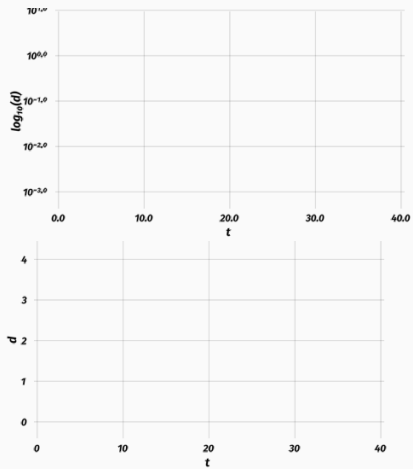
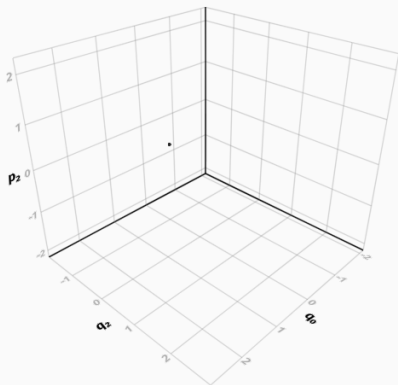
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Numerical simulations



Conclusions

Thank you!