

## Publications by Dmitrii Sadovskii

Below are listed 86 articles published in refereed journals and sorted by date of print.

- D. A. Sadovskii and B. I. Zhilinskiĭ. Rearrangement of energy levels between energy super-bands characterized by second Chern class. *Symmetry*, **14**(2):183/17, Jan. 2022.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Quaternionic Dirac oscillator. *J. Phys. A: Math. Theor.*, Aug 2022b. submitted to *J. Phys. A: Math. & Theor.*, ms no. [JPhysA-117217](#) on 21 Feb 2022; accepted Aug 5, 2022.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Universal local form of quaternionic slow-fast systems. in preparation, Nov. 2021a.
- T. Iwai, D. A. Sadovskii, and B. I. Zhilinskiĭ. Angular momentum coupling, Dirac oscillators, and quantum band rearrangements in the presence of momentum reversal symmetries. *J. Geom. Mech.*, **12**(3):455–505, Jul 2020.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Monodromy in non-integrable systems on certain compact classical phase spaces. *Phys. Lett. A*, **383**(5):452–457, 2019. ISSN 0375-9601.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Qualitative models of intramolecular dynamics of acetylene: relation between the bending polyads of acetylene and perturbed Keplerian systems. *Mol. Phys.*, **116**(23-24):3564–3601, 5 2018.
- D. Fontanari and D. A. Sadovskii. Coherent states for the quantum complete rigid rotor. *J. Geom. Phys.*, **129**:70–89, Jul 2018.
- D. A. Sadovskii. Afterword to the paper by N. N. Nekhoroshev. *Rus. J. Nonlin. Dyn.*, **12**(3): 543–553, 2016.
- D. A. Sadovskii. Nekhoroshev’s approach to Hamiltonian monodromy. *Reg. & Chao. Dyn.*, **21**(6):720–758, Nov 2016. ISSN 1560-3547. URL [http://www.mathnet.ru/php/archive.phtml?wshow=paper&jrnid=rcd&paperid=221&option\\_lang=eng](http://www.mathnet.ru/php/archive.phtml?wshow=paper&jrnid=rcd&paperid=221&option_lang=eng).
- D. Fontanari, F. Fassò, and D. A. Sadovskii. Quantum manifestations of Nekhoroshev stability. *Phys. Lett. A*, **380**:3167–3172, Aug 2016.
- A. V. Borisov, A. V. Bolsinov, A. I. Nejshtadt, D. A. Sadovskii, and B. I. Zhilinskiĭ. Nikolai N. Nekhoroshev. *Reg. & Chao. Dyn.*, **21**(6):593–598, 12 2016. On the 70th Birthday of Nikolai N. Nekhoroshev.
- M. L. Senent, S. Dalbouha, A. Cuisset, and D. A. Sadovskii. Theoretical spectroscopic characterization at low temperatures of dimethyl sulfoxide: the role of anharmonicity. *J. Phys. Chem. A*, **119**(37):9644–9652, August 27 2015.
- D. Fontanari and D. Sadovskii. Perturbations of the hydrogen atom by inhomogeneous static electric and magnetic fields. *J. Phys. A: Math. Theor.*, **48**(9):095203, 3 2015.
- F. Fassò, D. Fontanari, and D. A. Sadovskii. An application of Nekhoroshev theory to the study of the perturbed hydrogen atom. *Math. Phys., Analysis and Geom.*, **18**(1):30, 2015.
- R. H. Cushman, J. M. Robbins, and D. A. Sadovskii. The sign exchange bifurcation in a family of linear Hamiltonian systems. In O. N. Kirillov and D. E. Pelinovsky, editors, *Nonlinear physical systems: spectral analysis, stability, and bifurcations*, chapter 3, pages 41–65. Wiley, New York, 20 Dec 2013. ISBN 978-1-84821-420-0. doi: [10.1002/9781118577608](https://doi.org/10.1002/9781118577608).
- A. Cuisset, M.-A. M. Drumel, F. Hindle, G. Mouret, and D. A. Sadovskii. Rotational structure of the five lowest frequency fundamental vibrational states of dimethylsulfoxide. *Chem. Phys. Lett.*, **586**(Suppl. C):10–15, 2013. ISSN 0009-2614.

- A. Cuisset and D. A. Sadovskii. Gyroscopic destabilisation in polyatomic molecules. rotational structure of the low-frequency bending vibrational states  $\nu_{23}$  and  $\nu_{11}$  of dimethylsulfoxide (DMSO). *J. Chem. Phys.*, **138**:234302/1–18, Jun 2013.
- A. Cuisset, O. Pirali, and D. A. Sadovskii. Gyroscopic destabilization of molecular rotation and quantum bifurcation observed in the structure of the  $\nu_{23}$  fundamental of dimethylsulfoxide. *Phys. Rev. Lett.*, **109**:094101, Aug 2012.
- D. A. Sadovskii. Classical and quantum Hamiltonian monodromy: a case study of the hyperbolic circular billiard. This manuscript, intended as a popular chapter for physicists, was largely written in 2008, Jul 2010.
- D. A. Sadovskii. On the geometry of resonant oscillator systems. Started in 2000 as an intended chapter in the collection of papers edited by Louis Michel (?). Under development until 2010. Results which remain largely unpublished concern the geometry of the singular reduction of two-oscillator systems in  $m_1:m_2$  resonance, the Poisson morphism map of the reduced phase space  $P_m^{m_1:m_2}$  to a smooth  $S^2$  (theorem 5.2). There are also some interesting results on 3-oscillator systems with and without additional  $SO(2)$  symmetry, and local (non-compact) analysis of two-mode systems in the presence of  $C_k$ -symmetry, Sept 2010b.
- D. A. Sadovskii, D. N. Kozlov, and P. P. Radi. Direct absorption transitions to highly excited polyads 8, 10, and 12 of methane. *Phys. Rev. A*, **82**:012503/1–17, Jul 2010.
- K. Efsthathiou and D. A. Sadovskii. Normalization and global analysis of perturbations of the hydrogen atom. *Rev. Mod. Phys.*, **82**(3):2099–2154, Aug 2010.
- A. Cuisset, L. Nanobashvili, I. Smirnova, R. Bocquet, F. Hindle, G. Mouret, O. Pirali, P. Roy, and D. A. Sadovskii. Far-infrared high resolution synchrotron FTIR spectroscopy of the  $\nu_{11}$  bending vibrational fundamental transition of dimethylsulfoxide. *Chem. Phys. Lett.*, **492**:30–34, May 2010.
- K. Efsthathiou, O. V. Lukina, and D. A. Sadovskii. Complete classification of qualitatively different perturbations of the hydrogen atom in weak near orthogonal electric and magnetic fields. *J. Phys. A: Math. Theor.*, **42**:055209/1–29, 2009.
- J. B. Delos, G. Dhont, D. A. Sadovskii, and B. I. Zhilinski. Dynamical manifestations of Hamiltonian monodromy. *Ann. Phys.*, **324**:1953–1982, Sep 2009. ISSN 0003-4916.
- D. A. Sadovskii. Resonant integrable approximations of a general perturbation of the hydrogen atom by electric and magnetic fields. This manuscript, written in 2006–2008, is both a preparation for and a followup of the discovery of resonance zones (Efsthathiou et al., 2007) and most of its results were incorporated into (Efsthathiou and Sadovskii, 2010), Jan 2008a.
- K. Efsthathiou, O. V. Lukina, and D. A. Sadovskii. Most typical 1:2 resonant perturbation of the hydrogen atom by weak electric and magnetic fields. *Phys. Rev. Lett.*, **101**:253003/1–4, Dec 2008.
- J. B. Delos, G. Dhont, D. A. Sadovskii, and B. I. Zhilinski. Dynamical manifestations of Hamiltonian monodromy. *Europhys. Lett.*, **83**:24003/1–6, Jul 2008.
- D. A. Sadovskii and B. I. Zhilinski. Hamiltonian systems with detuned 1:1:2 resonance: Manifestation of bidromy. *Ann. Phys.*, **322**:164–200, Jan 2007.
- K. Efsthathiou, D. A. Sadovskii, and B. I. Zhilinski. Classification of perturbations of the hydrogen atom by small static electric and magnetic fields. *Proc. Roy. Soc. London, Ser. A*, **463**:1771–1790, Jul 2007.
- K. Efsthathiou, R. H. Cushman, and D. A. Sadovskii. Fractional monodromy of the 1:(–2) resonance. *Adv. Math.*, **209**:241–273, Feb 2007b. ISSN 0001-8708.

- H. Crogman, V. Boudon, and D. A. Sadovskii. Local modes of silane within the framework of stretching vibrational polyads. *Europ. Phys. J. D*, **42**:61–72, 2007.
- M. Sanrey, M. Joyeux, and D. A. Sadovskii. Classical and quantum-mechanical plane switching in CO<sub>2</sub>. *J. Chem. Phys.*, **124**:74318–1–12, Feb 2006.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Quantum monodromy and its generalizations and molecular manifestations. *Mol. Phys.*, **104**:2595–615, Aug 2006.
- N. N. Nekhoroshev, D. A. Sadovskii, and B. I. Zhilinskiĭ. Fractional Hamiltonian monodromy. *Ann. H. Poincaré*, **7**:1099–211, 2006.
- I. N. Kozin, D. A. Sadovskii, and B. I. Zhilinskiĭ. Assigning vibrational polyads using relative equilibria: application to ozone. *Spectrochim. Act. A*, **61**:2867–85, Oct 2005a.
- K. Efstathiou and D. A. Sadovskii. *Geometric Mechanics and Symmetry. The Peyresq Lectures*, chapter No Polar Coordinates. Lectures by Richard Cushman, pages 211–302. Cambridge University Press, Cambridge, UK, Jun 2005. ISBN 978-0521539579.
- D. A. Sadovskii. Symmetric Hamiltonian Hopf bifurcation of a relative equilibrium of the 1:1:2 resonant oscillator. Most likely a preparation for (Cushman et al., 2004; Sadovskii and Zhilinskiĭ, 2007), Jul 2004.
- A. Giacobbe, R. H. Cushman, D. A. Sadovskii, and B. I. Zhilinskiĭ. Monodromy of the quantum 1:1:2 resonant swing spring. *J. Math. Phys.*, **45**:5076–100, Dec 2004.
- K. Efstathiou, D. A. Sadovskii, and B. I. Zhilinskiĭ. Analysis of rotation-vibration relative equilibria on the example of a tetrahedral four atom molecule. *SIAM J. Appl. Dyn. Syst. (SIADS)*, **3**:261–351, 2004a.
- K. Efstathiou, M. Joyeux, and D. A. Sadovskii. Global bending quantum number and the absence of monodromy in the HCN↔CNH molecule. *Phys. Rev. A*, **69**:32504–1–15, Mar 2004b.
- K. Efstathiou, R. H. Cushman, and D. A. Sadovskii. Hamiltonian Hopf bifurcation of the hydrogen atom in crossed fields. *Physica D*, **194**:250–74, Jul 2004a.
- K. Efstathiou and D. A. Sadovskii. Perturbations of the 1:1:1 resonance with tetrahedral symmetry: a three degree of freedom analogue of the two degree of freedom Hénon-Heiles hamiltonian. *Nonlinearity*, **17**:415–46, Mar 2004.
- R. H. Cushman, H. R. Dullin, A. Giacobbe, D. D. Holm, M. Joyeux, P. Lynch, D. A. Sadovskii, and B. I. Zhilinskiĭ. CO<sub>2</sub> molecule as a quantum realization of the 1:1:2 resonant swing-spring with monodromy. *Phys. Rev. Lett.*, **93**:024302/1–4, Jul 2004.
- M. Joyeux, D. A. Sadovskii, and J. Tennyson. Monodromy of the LiNC/NCLi molecule. *Chem. Phys. Lett.*, **382**:439–42, Dec 2003.
- K. Efstathiou, D. A. Sadovskii, and R. H. Cushman. Linear Hamiltonian Hopf bifurcation for point-group-invariant perturbations of the 1:1:1 resonance. *Proc. Roy. Soc. London, Ser. A*, **459**:2997–3019, Dec 2003.
- N. N. Nekhoroshev, D. A. Sadovskii, and B. I. Zhilinskiĭ. Fractional monodromy of resonant classical and quantum oscillators. *C. R. Acad. Sci. Paris, Sér. I*, **335**(11):985–8, Dec 2002.
- L. Grondin, D. A. Sadovskii, and B. I. Zhilinskiĭ. Monodromy as topological obstruction to global action-angle variables in systems with coupled angular momenta and rearrangement of bands in quantum spectra. *Phys. Rev. A*, **65**:012105/1–15, Jan 2002.

- C. Van-Hecke, D. A. Sadovskii, B. I. Zhilinskiĭ, and V. Boudon. Rotational-vibrational relative equilibria and the structure of quantum energy spectrum of the tetrahedral molecule  $P_4$ . *European Physical Journal D*, **17**:13–35, Oct 2001a.
- D. A. Sadovskii. *Symmetry and Perturbation Theory (SPT2001)*, chapter Normal forms, geometry, and dynamics of atomic and molecular systems with symmetry, pages 191–205. World Scientific, Singapore, Oct 2001. ISBN 981-02-4793-1. doi: 10.1142/9789812794543\_0026. Proceedings of the international conference, Cala Gonone, Sardinia, Italy 6 - 13 May 2001.
- G. Dhont, D. A. Sadovskii, B. I. Zhilinskiĭ, and V. Boudon. Analysis of the ‘unusual’ vibrational components of triply degenerate vibrational mode  $\nu_6$  of  $Mo(CO)_6$  based on the classical interpretation of the effective rotation-vibration hamiltonian. *Journal of Molecular Spectroscopy*, **201**:95–108, May 2000.
- R. H. Cushman and D. A. Sadovskii. Monodromy in the hydrogen atom in crossed fields. *Physica D*, **142**:166–96, Aug 2000.
- C. Van-Hecke, D. A. Sadovskii, and B. I. Zhilinskiĭ. Qualitative analysis of molecular rotation starting from inter-nuclear potential. *Europ. Phys. J. D*, **7**:199–209, Sep 1999.
- D. A. Sadovskii. Complete analysis of the hydrogen atom in crossed fields based on the second normal form. Preparation for (Cushman and Sadovskii, 1999), with Appendix B.2 discussing for the first time the projection of the second reduced phase space  $P_m$  onto a smooth 2-sphere, a never published result that continued into (Sadovskii, 2010b, 2008a), Feb 1999.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Monodromy, diabolic points, and angular momentum coupling. *Phys. Lett. A*, **256**:235–44, Jun 1999.
- R. H. Cushman and D. A. Sadovskii. Monodromy in perturbed Kepler systems: hydrogen atom in crossed fields. *Europhys. Lett.*, **47**:1–7, Jul 1999.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Tuning the hydrogen atom in crossed fields between the Zeeman and Stark limits. *Phys. Rev. A*, **57**:2867–84, Apr 1998.
- I. Dabrowski and D. A. Sadovskii. Spectra of rare gas hydrides. VI. the  $4f$  complex and the electronic structure of KrD. *Journal of Chemical Physics*, **107**:8874–85, Dec 1997.
- D. A. Sadovskii, B. I. Zhilinskiĭ, and L. Michel. Collapse of the Zeeman structure of the hydrogen atom in an external electric field. *Phys. Rev. A*, **53**:4064–4067, Jun 1996. URL <http://purple.univ-littoral.fr/~dima/preprints/Collapse.ps.gz>.
- D. A. Sadovskii and J. B. Delos. Bifurcation of the periodic orbits of Hamiltonian systems: an analysis using normal form theory. *Phys. Rev. E*, **54**:2033–70, Aug 1996.
- D. A. Sadovskii, J. A. Shaw, and J. B. Delos. Organization of sequences of bifurcations of periodic orbits. *Phys. Rev. Lett.*, **75**:2120–2123, Sep 1995.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Counting levels within vibrational polyads: generating function approach. *J. Chem. Phys.*, **103**:10520–36, Dec 1995.
- W. A. Majewski, A. R. W. McKellar, D. A. Sadovskii, and J. K. G. Watson. New observations and analysis of the infrared vibration-rotation spectrum of  $H_3^+$ . *Can. J. Phys.*, **72**:1016–27, Nov 1994.
- I. Dabrowski and D. A. Sadovskii. Spectra of the rare gas hydrides. V. the  $np$  Rydberg series of KrD. *Mol. Phys.*, **81**:291–326, Feb 1994.

- T. Amano, M. C. Chan, S. Civis, A. R. W. McKellar, W. A. Majewski, D. A. Sadovskii, and J. K. G. Watson. The infrared vibration-rotation spectrum of the  $D_3^+$  molecular ion: extension to higher vibrational and rotational quantum numbers. *Canadian Journal of Physics*, **72**:1007–15, Nov 1994.
- D. A. Sadovskii, N. G. Fulton, J. R. Henderson, J. Tennyson, and B. I. Zhilinskiĭ. Nonlinear normal modes and local bending vibrations of  $H_3^+$  and  $D_3^+$ . *Journal of Chemical Physics*, **99**:906–18, Jul 1993.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Group-theoretical and topological analysis of localized rotation-vibration states. *Phys. Rev. A*, **47**:2653–71, Apr 1993.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Qualitative study of a model three-level Hamiltonian with  $SU(3)$  dynamical symmetry. *Phys. Rev. A*, **48**:1035–44, Aug 1993b.
- V. M. Krivtsun, D. A. Sadovskii, and B. I. Zhilinskiĭ. Study of the  $\nu_1, \nu_3$  bands of  $^{120}\text{SnH}_4$ . II. Semiclassical qualitative analysis: critical phenomena and diabolic points. *Proceedings of the SPIE The International Society for Optical Engineering*, 1724:165–76, 1992.
- V. M. Krivtsun, D. A. Sadovskii, and E. P. Snegirev. Study of the  $\nu_1, \nu_3$  bands of  $^{120}\text{SnH}_4$ . I. Diode laser spectroscopy. *Proceedings of the SPIE The International Society for Optical Engineering*, 1724:148–64, 1992b.
- I. Dabrowski, G. DiLorenzo, G. Herzberg, J. W. C. Johns, D. A. Sadovskii, and M. Vervloet. Spectra of the rare gas hydrides. iv. three new bands of argon deuteride involving a low-lying ‘p’ rydberg state. *Journal of Chemical Physics*, **97**:7093–110, Nov 1992.
- D. A. Sadovskii. Standard decomposition of the product of spherical tensor equivalent operators. *Physics Letters A*, **156**:377–80, Jul 1991.
- V. M. Krivtsun, D. A. Sadovskii, and E. P. Snegirev. Rotational structure of  $^{120}\text{SnH}_4$  molecule:  $\nu_1, \nu_3$  bands. *Optics and Spectroscopy*, **70**:590–2, May 1991a.
- D. A. Sadovskii, B. I. Zhilinskiĭ, J. P. Champion, and G. Pierre. Manifestation of bifurcations and diabolic points in molecular energy spectra. *J. Chem. Phys.*, **92**:1523–37, Feb 1990.
- V. M. Krivtsun, D. A. Sadovskii, and B. I. Zhilinskiĭ. Critical phenomena and diabolic points in rovibrational energy spectra of spherical top molecules. *Journal of Molecular Spectroscopy*, **139**:126–46, Jan 1990.
- V. M. Krivtsun, D. A. Sadovskii, E. P. Snegirev, A. P. Shotov, and I. I. Zasavitskiĭ. Diode laser study of the  $\nu_1$  and  $\nu_3$  bands of the  $^{120}\text{SnH}_4$  molecule. *J. Molec. Spectros.*, **139**:107–25, Jan 1990b.
- O. I. Davarashvili, B. I. Zhilinskiĭ, V. M. Krivtsun, D. A. Sadovskii, and E. P. Snegirev. Experimental study of a sequence of quantum bifurcations leading to the crossover of a rotational multiplet. *JETP Letters*, **51**:18–21, Jan 1990.
- B. I. Zhilinskiĭ and D. A. Sadovskii. Qualitative changes in the structure of rovibrational levels. Dyad  $\nu_2, \nu_4$  of spherical top molecules. *Bulletin of the Academy of Sciences of the USSR, Physical Series*, **53**:80–83, 1989.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Contact transformations in tensor formalism. effective Hamiltonian and dipole moment for the  $\nu_2, \nu_4$  dyad of tetrahedral molecules. *Journal of Quantitative Spectroscopy and Radiative Transfer*, **42**:575–83, Dec 1989a.
- G. Pierre, D. A. Sadovskii, and B. I. Zhilinskiĭ. Organization of quantum bifurcations: crossover of rovibrational bands in spherical top molecules. *Europhys. Lett.*, **10**:409–14, Nov 1989.

- D. A. Sadovskii and B. I. Zhilinskiĭ. Qualitative analysis of vibration-rotation Hamiltonians for spherical top molecules. *Mol. Phys.*, **65**:109–128, Sep 1988.
- V. B. Pavlov-Verevkin, D. A. Sadovskii, and B. I. Zhilinskiĭ. On the dynamical meaning of the diabolic points. *Europhys. Lett.*, **6**:573–8, Aug 1988.
- B. I. Zhilinskiĭ and D. A. Sadovskii. Qualitative changes in the rotational structure of vibrational states with increasing angular momentum. *Optics and Spectroscopy*, **61**:301–304, Sep 1986.
- B. I. Zhilinskiĭ and D. A. Sadovskii. Invariant combinations of spectroscopic parameters of tetrahedral molecules. *Moscow University Bulletin - Chemistry*, **27**:145–148, 1986b.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Theoretical analysis of spectroscopic constants for spherical tops:  $\nu_2$ ,  $\nu_4$  bands of  $AB_4$  molecules. *Journal of Molecular Spectroscopy*, **115**:235–257, Feb 1986.
- D. A. Sadovskii and B. I. Zhilinskiĭ. Comparative analysis of spectroscopic constants of tetrahedral molecules:  $\nu_1$  and  $\nu_3$  bands of silane and germane. *Optics and Spectroscopy*, **58**:344–347, Mar 1985.

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