

**Dr. Anton A. Lipovka***Profesor Investigador Tiempo Completo Titular C*

Universidad de Sonora

Departamento de Investigación en Física

Academia: Física Matemática



Nombramiento en el SNI Nivel I

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Areas of scientific interest:

Theoretical physics, Mathematical physics, Astrophysics, Cosmology.

Publications:**He has published over 100 articles. His most important achievements include:**

2019-2022 The problem of Dark Matter in galaxies (the problem of rotation curves) has been solved. It has been proven that dark matter is not required to explain the rotation curves. Moreover, there is no room for dark matter in galaxies, since if it existed in quantities of even about 2% of the baryonic mass of galaxies, the rotation curves would be dramatically different from those we observe. **Details:** <https://lipovka.me/>

1. Anton A. Lipovka. (2022) "Gas kinetics of galactic disks explains rotation curves of S-type galaxies without a need for dark matter." *International Journal of Modern Physics A*, v.37, No. 27, 2250171 <https://doi.org/10.1142/S0217751X22501718>

2013-2018 General Relativity and Quantum Mechanics (QM) were unified. Planck's constant was calculated from first principles, as an adiabatic invariant of the free electromagnetic field, propagating in the expanding universe. Foundations of QM were revealed. Complete equations of electrodynamics have been derived to describe any system (quantum, classical, relativistic). The physical meaning of wave functions has been explained. The Aharonov-Bohm effect has been explained for the first time. The vacuum catastrophe problem has been solved. The EPR paradox problem has been resolved. The fundamental equations of quantum mechanics are derived from first principles. **Details:** <https://lipovka.me/>

Published in:

2. Lipovka A. A., Andrianarijaona V. M., Davis C. H., (2024) Derivation of the Klein – Gordon – Fock equation from first principles, *St. Petersburg State Polytechnical University Journal. Physics and Mathematics*. 17 (2) 150–159. DOI: <https://doi.org/10.18721/JPM.17212>

3. Lipovka, A. (2017) Physics on the adiabatically changed Finslerian manifold and cosmology. *Journal of Applied Mathematics and Physics*, 5, 582-595. doi: 10.4236/jamp.2017.53050 <https://doi.org/10.48550/arXiv.1608.04596>

4. Ivan A. Cardenas & Anton A. Lipovka. (2019) Variation of the fine-structure constant caused by expansion of the Universe. *Modern Physics Letters A* 34 (38) 1950315 World Scientific Publishing Company <https://doi.org/10.1142/S0217732319503152>

5. Lipovka, A. (2014) Planck constant as adiabatic invariant characterized by hubble's and cosmological constants. *Journal of Applied Mathematics and Physics*, 2, 61-71. doi: 10.4236/jamp.2014.25009. <http://dx.doi.org/10.4236/jamp.2014.25009>

6. Lipovka, A. (2016) Nature of the quantum potential. *Journal of Applied Mathematics and Physics*, 4, 897-902. DOI: 10.4236/jamp.2016.45098

Some selected publications on other topics:

7. A.A. Lipovka (2018) Improved analytical model for the mass distribution in S-type galaxies. *Publications of the Astronomical Society of Japan*, Volume 70, Issue 5, 1 October 2018, 86, Online ISSN 2053-051X Print ISSN 0004-6264 <https://doi.org/10.1093/pasj/psy082>

8. R. Nunez-Lopez, A.A. Lipovka. (2011) First stars formation with the presence of a primordial magnetic field. *Rev. Mex. A. A.* v.40 p.25-25, ISSN 0185-1101

9. E.A. Leon, J.A. Nieto, R. Nunez-Lopez, A.A. Lipovka. (2011) Higher dimensional cosmology: relations among the radii of two homogeneous spaces. *Mod. Phys. Lett. A* v.26 Issue:11 pp.805-814. doi:10.1142/S0217732311035316 Print ISSN: 0217-7323 Online ISSN: 1793-6632 publisher: World Scientific

10. A.V. Boldycheva, A.A. Lipovka, N.M. Lipovka, K.L. Maslennikov, J.C. Saucedo Morales. (2010) Catalog of galaxies of the A1367 cluster and its vicinity. Spectral investigation some of them. *Astronomy reports* (2010) v.54, No.8 pp.730-734, ISSN PRINT: 1063-7729, ISSN ONLINE: 1562-6881, Pleiades Publishing, Interperiodica, Distributed worldwide by Springer.

11. D. Puy, V. Dubrovich, A.A. Lipovka, D. Talbi, & P. Volanthen. (2007). Molecular Fluorine chemistry in the early Universe. *Astron. & Astrophys.* V. 476, (2), pp.685-689.

12. R. Núñez López, A.A. Lipovka, V. Avila Reese. (2006) HD molecule and search for early structure-formation signatures in the Universe. *MNRAS* 369, 2005 // astro-ph/0602474

13. A.A. Lipovka, R. Núñez-López, V. Avila Reese. (2005) The cooling function of HD molecule

revisited. *MNRAS* v.361, pp. 850-854 , // astro-ph/0503682

14. A.A. Lipovka, J.L. Marín, R. Riera, R. Rosas. (2002) Two - Dimensional Quantum Dot in an External Magnetic Field. *Phys. Low-Dim. Struct.* V.9/10 pp. 97-104,
15. A.A. Lipovka, J. Saucedo, J. Campos, I. Soto. (2002) Cosmological Chemistry and the Formation of the First Objects. *Astrophysics and Space Science Librerary* Volume 274, pp. 73-76 (2002) Kluwer Academic Publishers.
16. M.A.Cervantes, A.A.Lipovka. (2001) Bessel - like beam and axial optical gratings *Optical J.*, v. 68(11), p. 20-25.
17. A.A. Lipovka, M.A. Cervantes. (2001) Toroidal optical dipol grating. *Opt. Commun.*, Vol.198, pp.101-105.
18. M.A. Cervantes, A.A. Lipovka and M. Molinar Tavares. (2000) Circular Aperture Diffraction of Multiple Interfering Beams. *Opt. Commun.* Vol.185, pp.233-237.
19. V.K. Dubrovich, A.A. Lipovka. (1999) Non-linear efects in a strong radiation field and distances in the universe. *Gravitation and Cosmology* Vol.5, pp. 164-170,
20. V.K. Dubrovich, A.A. Lipovka. (1999) CO molecules in the quasars 1556+3517 and 0840+3633. *Astronomy Letters* v.25(10), pp.625-627.
21. A.P.Venger, I.V.Gosachinskij, A.A.Lipovka, V.K.Dubrovich, A.S.Morozov. (1997) The search of molecular hydrogen ion H_2^+ line emission at frequency of 1404 MHz in the Jovian atmosphere and in the Sagittarius B2 source. *Astronomy Letters*, v.23, No.3, pp.370-372,
22. V.K. Dubrovich, A.A. Lipovka. (1995) Distortions of Cosmic Blackbody spectrum due to luminescence of H_2D^+ molecules. *Astron. Astrophys.* v.296, pp. 301-306
23. A.A. Lipovka. (1995) Solution of the balance equations system of quantum levels population of atoms and molecules. *Astronomy Reports*, V.39, pp. 347-350.
24. V.K. Dubrovich, A.A. Lipovka. (1995) Radioabsorption by HeH^+ molecules in the spectra of remote QSOs. *Astron. Astrophys.* v.296, pp. 307-309
25. V.K. Khersonskij, A.A. Lipovka. (1993) Free-bound transitions in LiH molecule. *Astrophys. Issled.* (Izv. SAO) V.36, pp.88-106,
26. V.K. Khersonskij,A.A. Lipovka. (1992) Rotational transitions of interstellar molecule NH_2SH . *Astron. Zh.*,V.69,(4), pp. 744-752
27. V.K. Khersonskij,A.A. Lipovka. (1992) HOCl in interstellar medium. *Astrophysics* v.35(1), p.333,

Theses supervised:

Maestría: Iván Cárdenas “Relatividad General de Einstein y síntomas de unificación en una variedad de Riemann-Cartan”

Maestría: Fernando Javier Sánchez Rodríguez “Medición y Caracterización de haces de muones paralelos”

Maestría: Edgar Alejandro León Espinosa "Unified theory of dualities for Linearized Gravity"

Maestría: Julio Cesar Campos García "Química Primordial en un Modelo no Estándar del Big Bang"

Maestría: Martín Molinar Tavares "Difracción de Ondas Interferidas: Caso de Simetría Circular"

Doctorado: Armando Meza Gaxiola "Enfoques geométricos en la construcción de las bases de la física cuántica."

Doctorado: Iván Cárdenas “Constante de Planck y aspectos físicos en el espacio tiempo de Eistein-Cartan”

Doctorado: Edgar Alejandro León Espinosa "Dualidades y Matroides en Teorías de Gravedad con distinta dimensionalidad"

Doctorado: Ramona Núñez López "Minihalos y Primera Luz de la Época Oscura"

Doctorado: Julio Cesar Campos García . “Elementos pesados primigenios y formación de las primeras estructuras”

Evaluation Committee

Doctorado Jesús Adrián Zatarain Alvarado

Doctorado Humberto Camacho Guillen

Doctorado Javier Montano Peraza

Doctorado Meza Gaxiola, Armando

Doctorado Maricela Fernández Lozada
(entre otros)

Research Projects

IN107706-3 PAPIIT UNAM

Presentations

I have more than 200 presentations

Teaching at the Postgraduate Level

I have taught 35 courses, all at the postgraduate level, including the following:

Mathematical Methods in Physics, Quantum Field Theory, Particle Physics

Quantum optics, Plasma physics, Molecular physics, Introduction to General Relativity, Relativistic quantum mechanics, Quantum chemistry, Advanced electrodynamics, Differential geometry, Cosmology, Numerical methods, General relativity.