

Curriculum Vitae

Marcos Moshinsky

Estudios:

Licenciatura en Física
Universidad Nacional Autónoma de México, 1944.
Maestría en Física
Princeton University, 1947.
Doctorado en Física
Princeton University, 1949.

Investigador Titular en el Instituto de Física de la Universidad Nacional Autónoma de México, donde ha estado laborando desde 1942, siendo Jefe del Departamento de Física Teórica de 1968-1974. Ha dirigido también un grupo de el Instituto Nacional de Energía Nuclear (INEN), desde 1960 hasta 1984 y es miembro de El Colegio Nacional desde 1972. Fundador de la Escuela Latinoamericana de Física (ELAF) en 1959 y organizador de sus sesiones en México en 1959, 1962, 1965, 1968 y 1971, así como Profesor de la misma en 1974, 1977, 1980, 1983, 1986, 1989, 1992, 1995 y 1998.

Distinciones Académicas

Premio de la Academia de la Investigación Científica 1961,
Premio Elía Sourasky, 1966,
Premio Nacional de Ciencias 1968,
Premio Luis Elizondo, 1971,
Premio UNAM, Investigación en Ciencias Exactas 1985,
Premio Príncipe de Asturias, Oviedo, España, 1988,
Presidente de la Academia de la Investigación Científica 1962-1963,
Presidente de la Sociedad Mexicana de Física 1967-1969,
Premio Interamericano de Ciencias “Bernardo A. Houssay” (OEA) Washington, DC 1990.
Editor, Revista Mexicana de Física 1952-1967,
Editor Asociado, Nuclear Physics 1958-1965,
Editor Asociado, Physics Letters 1965-1972,
Editor Asociado, Journal of Mathematical Physics 1971-1973,
Andrei Sakharov Medal for Human Rights USSR, 1991.
Medalla al Mérito Académico de la Sociedad Mexicana de Física
Medalla de Oro con su nombre, que se otorga anualmente, a partir de 1993.
Doctor Honoris Causa UNAM 1996.
Premio de Investigación en Ciencias de la UNESCO, París, Francia 1997.
Juchiman de Plata, otorgado por la Sociedad del mismo nombre. Villahermosa, Tab. 1997.
Nivel III del Sistema Nacional de Investigadores.
Medalla Wigner otorgada en el Congreso de Teoría de Grupos y sus Aplicaciones Julio 14, de 1998, en Hobart, Australia.
Doctor Honoris Causa, Goethe University, Frankfurt, Germany July 2000
Investigador Nacional de Excelencia Sistema Nacional de Investigadores (2003).
Premio Weizmann en Ciencia y Humanidades, Instituto Weizmann Israel, 2003
Medalla al Mérito Universitario “Justo Sierra”. UNAM Mayo 2005.

Investigador o Profesor invitado por un semestre en:

Instituto Henri Poincaré (1954),
Universidad de Princeton (1959-1960),
State University of New York at Stony Brook (1967-1968),
Universidad de Montreal (1973 y 1977),

Conferencista invitado en más de 200 universidades y centros de investigación en Estados Unidos, Canadá, casi toda Europa (Este y Oeste), Latino América, así como Israel, India, Pakistán, China, Japón, Australia y Africa del Sur. Participante en más de 100 conferencias nacionales e internacionales.

Ha publicado más de 250 artículos periodísticos sobre ciencia, educación y su impacto social.

Miembro de:

Sociedad Mexicana de Física
American Physical Society
Academia de la Investigación Científica (actualmente Academia Mexicana de Ciencias
Academia Brasileira de Ciencia
Academia Europea de Ciencias, Artes y Letras
Academia Pontificia de Ciencias
Academia de Ciencias de América Latina
Academia de Ciencia del Tercer Mundo
American Academy of Arts and Science
Academia Nacional de Ciencias Exactas, Físicas y Naturales de Argentina.

Ha dirigido las tesis doctorales de 14 estudiantes graduados y el mismo número de post-doctorados de todas partes del mundo.

También ha dirigido cerca de 34 tesis para el grado de físico.

Ha impartido en cada semestre en la Facultad de Ciencias-UNAM, el curso sobre Mecánica Cuántica, así como cursos a nivel de graduado sobre diferentes temas de física matemática y nuclear.

Sus publicaciones científicas en el campo de la Física Nuclear, Teórica, Física Matemática y otros campos, incluye a 5 libros y cerca de 280 artículos de investigación.

Libros

- 1 "Tables of Transformation Brackets" with T. A. Brody, (Gordon & Breach 1969).
- 2 "Group Theory and the Many Body Problem" (Gordon & Breach 1967).
- 3 "The Harmonic Oscillator in Modern Physics: From Atoms to Quarks" (Gordon & Breach 1969). Russian Translation (MIR 1972).
- 4 "Many Body Problems and Related Problems of Theoretical Physics". Editors M. Moshinsky T. A. Brody and G. Jacob. (Gordon & Breach 1967).
- 5 "The harmonic oscillator in modern physics", en colaboración con Yu. F. Smirnov. Tiene 412 páginas. (Hardwood Academic Publishers, The Netherlands 1996).

Publicaciones en Honor de MM y algunas contribuciones no científicas

- 1 Proceedings del Simposium Internacional de Teoría de Grupos de la American Institute of Physics en honor del Prof. Marcos Moshinsky por el 70 aniversario y 50 años en el Instituto de Física, Cocoyoc Mor. 400 pgs. Editors A. Frank y K. B. Wolf Symmetries in Physics (Springer-Verlag 1992).
- 2 Proceedings del Simposium Internacional de Teoría de Grupos de la American Institute of Physics en honor del Prof. Marcos Moshinsky por el 70 aniversario y 50 años en el Instituto de Física, Cocoyoc Mor. 266 pgs. Editors A. Frank, T.H.Seligman y K. B. Wolf (Springer-Verlag 1992).
- 3 Reflexiones sobre educación, Ciencia y Sociedad. Marcos Moshinsky (1970-1976) Vol. I El Colegio Nacional 639 pgs. (1995).
- 4 Reflexiones sobre educación, Ciencia y Sociedad. Marcos Moshinsky (1976-2000) Vol. II El Colegio Nacional 389 pgs.(2000).
- 5 Testimonios: Marcos Moshinsky, ochenta años de vida y 60 años de trabajo científico. Editores Alejandro Frank y Kurt Bernardo Wolf. 185 pgs. Coordinación de la Investigación Científica-UNAM (2001).
- 6 Forjadores de la Ciencia en la UNAM. Conferencias del ciclo "Mi vida en la ciencia". Marcos Moshinsky pgs 14-32. "Semblanza del Dr. Marcos Moshinsky". Alejandro Frank pgs. 33-36. Coordinación de la Investigación Científica-UNAM (2003).

References

- [1] Problemas de condiciones a la frontera de características discontinuas. *Bol. Soc. Mat. Mex.* **4**, 1 (1947).
- [2] *Relativistic interactions by means of boundary conditions*. Ph.D Dissertation, Princeton University (1949).
- [3] Vibración de una membrana circular de dos densidades. *Rev. Ing. Hid.* **3**, 5 (1949).
- [4] Interference phenomena for particles obeying Bose or Fermi statistics. *Proc. A. Phil. Soc.* **94**, 53 (1950).
- [5] Interactions of Birkhoff's gravitational field with the electromagnetic and pair fields. *Phys. Rev.* **80**, **514**, (1950).
- [6] Auto-adjunticidad de problemas vectoriales de condiciones a la frontera. *Bol. Soc. Mat. Mex.* **7**, 1 (1950).
- [7] Boundary conditions for the description of nuclear reactions. *Phys. Rev.* **81**, 347 (1951).
- [8] Boundary conditions and time dependent states. *Phys. Rev.* **84**, 525 (1951).
- [9] Quantum mechanics in Fock space. *Phys. Rev.* **84**, 533 (1951).
- [10] Efectos transitorios en la dispersión por una esfera rígida. *Rev. Mex. Fís.* **1**, 29 (1952).
- [11] Sobre una clase de transformadas de interés en la dispersión nuclear. *Rev. Mex. Fís.* **1**, 114 (1952).
- [12] Diffraction in time. *Phys. Rev.* **88**, 625 (1952).
- [13] On a dynamical theory of scattering. In: *Novas Técnicas de Pesquisa en Física*. Academia Brasileira de Ciencias (1954), pp. 279-285.
- [14] Difracción en el tiempo y la ecuación de Dirac. *Rev. Mex. Fís.* **1**, 151 (1952).
- [15] On matrix boundary value problems [with J. Adem]. *Quart. App. Math.* **9**, 424 (1952).
- [16] Dispersión de neutrones por cristales en vibración. *Rev. Mex. Fís.* **2**, 137 (1953).
- [17] Poles of the S matrix for resonance reactions. *Phys. Rev.* **91**, 984 (1953).
- [18] Reacciones nucleares entre partículas con carga. *Rev. Mex. Fís.* **2**, 244 (1953).
- [19] Vibraciones térmicas de los cristales y la difracción de neutrones. *Rev. Mex. Fís.* **3**, 1 (1954).
- [20] Polos de la función S para dispersión de momento angular arbitrario. *Ann. Acad. Brasileira de Ciencias*, **25**, 343 (1953).
- [21] Description de la diffraction-hachage par une distribution de sources. *C.R. Acad. Sci. Paris*, **283**, 2395 (1954).
- [22] Definition et propriétés analytiques des matrices R et S associées aux forces tensorielles. I. Cas de la matrices R [with W. Laskar]. *C.R. Acad. Sci. Paris*, **283**, 2496 (1954).
- [23] II. Cas de la matrice S [with W. Laskar]. *C.R. Acad. Sci. Paris*, **289**, 29 (1954).
- [24] Forces tensorielles dépendant de la vitesse. *J. de Phys. et Radium*. **15**, 264 (1954).
- [25] Difracción en el tiempo asociada a una distribución de fuentes. *Rev. Mex. Fís.* **3**, 236 (1954).
- [26] Dispersión de ondas sonoras por una gota de líquido. *Rev. Mex. Fís.* **4**, 95 (1955).
- [27] Movimientos colectivos y las reacciones nucleares. *Rev. Mex. Fís.* **5**, 1 (1956).
- [28] Collective motions in nuclei [with A.M. Mallman]. Notes on the Summer Course in Theoretical Nuclear Physics (1956).

- [29] Velocity dependent forces and nuclear structure. I. Central forces. *Phys. Rev.* **106**, 117 (1957).
- [30] Repulsive core and nuclear shell theory. [with M. Bauer] *Nuclear Physics* **4**, 615 (1957).
- [31] Fuerzas nucleares con centro repulsivo y el modelo de capas del núcleo. Efectos de segundo orden. *Rev. Mex. Fís.* **6**, 185 (1957).
- [32] Velocity dependent forces and nuclear structure. II. Spin dependent forces. *Phys. Rev.* **109**, 933 (1958).
- [33] Short range forces and nuclear shell theory. *Nucl. Phys.* **8**, 19 (1958).
- [34] La interacción spin-órbita entre nucleones y el acoplamiento spin-órbita en el modelo de capas del núcleo. *Rev. Mex. Fís.* **7**, 95 (1958).
- [35] Transformation brackets for harmonic oscillator functions. *Nucl. Phys.* **13**, 104 (1959).
- [36] Matrix elements in nuclear shell theory. *Nucl. Phys.* **17**, 16 (1960).
- [37] Invariance principles and beta decay [with C.A. Mallmann and J. de Oyarzábal]. Notes of the Latin American school of Physics (1959).
- [38] Group theory of harmonic oscillators. I. The collective modes [with V. Bargmann]. *Nuclear Phys.* **18**, 697 (1960).
- [39] *Tables of transformation brackets* [with T.A. Brody] Monografías del Instituto de Física (1960). Reprinted by Gordon & Breach (1969).
- [40] Group theory of harmonic oscillators. II. The integrals of motion of the quadrupole-quadrupole interaction [with V. Bargmann]. *Nucl. Phys.* **23**, 177 (1961).
- [41] Dispersion relations and the causality concept. [with J.M. Lozano]. *N. Cimento* **20**, 59 (1961).
- [42] Simetrías y reglas de suma de los paréntesis de transformación [with T.A. Brody]. *Rev. Mex. Fís.* **9**, 181 (1960).
- [43] On exact solutions for the pairing plus quadrupole-quadrupole interactions. Proceedings of the Rutherford Jubilee Conference (1961).
- [44] The harmonic oscillator and supermultiplet theory. I. The single shell picture. *Nucl. Phys.* **31**, 384 (1962).
- [45] A soluble many body problem for particles in a Coulomb field. *Phys. Rev.* **126**, 1880 (1962).
- [46] Estudio teórico de los niveles de Ne^{20} [with E. Chacón]. 4° Simposio de Energía Nuclear (1962). Translation: Theoretical analysis of the energy levels in Ne^{20} . *Phys. Lett.* **1**, 330 (1962).
- [47] Wigner coefficients for the SU_3 group and some applications. *Rev. Mod. Phys.* **34**, 813 (1962).
- [48] Bases for the irreducible representations of the unitary groups and some applications. *J. Math. Phys.* **4**, 1128 (1963).
- [49] Complete classification of states of supermultiplets theory [with J. Nagel]. *Phys. Lett.* **5**, 173 (1963).
- [50] Group theory and many body problems with finite number of states. *Phys. Lett.* **6**, 305 (1963).
- [51] *Group theory and collective motions*. Notes of the Latin American School of Physics (1962).
- [52] Group theoretical methods and a model interaction in nuclear shell theory. Proceedings of the International Conference on Nuclear Physics (1964).
- [53] Operators that lower or raise the irreducible vector space of U_n [with J. Nagel]. *J. Math. Phys.* **6**, 682 (1965).
- [54] Normalization coefficients for lowering and raising operators and the matrix elements of the generators of U_n [with J. Nagel]. *Rev. Mex. Fís.* **14**, 29 (1965).

- [55] The three body problems and the SU_4 group [with E. Chacón]. *Rev. Mex. Fís.* **14**, 119 (1965).
- [56] Recurrence relations for the Wigner coefficients of unitary groups [with T.A. Brody and I. Renero]. *J. Math. Phys.* **6**, 1540 (1965).
- [57] Gel'fand states and the irreducible representations of the symmetric group. *J. Math. Phys.* **7**, 691 (1966).
- [58] Group theory of harmonic oscillators. III. States with permutational symmetry [with P. Kramer]. *Nuclear Physics* **82**, 241 (1966).
- [59] Group theory and nuclear structure in the $2s-1d$ -shell [with M. Berrondo and J. Pineda]. Proceedings of the Second Conference on Structure of Light and Medium Nuclei (U. of Kansas, 1967).
- [60] Studies on nuclear structure in the $2s-1d$ -shell. III. Group theory and particle hole states [with J. Flores]. *Nucl. Phys.* **A93**, 81 (1967).
- [61] Group theory and the many body problems. In: *Physics of Many Particle Systems*, (Gordon & Breach, 1966); reproduced in expanded book form with the same title by Gordon & Breach (1967).
- [62] Some matrix elements and normalization coefficients in SU_n [with T.A. Brody and I. Renero]. *Rev. Mex. Fís.* **15**, 145 (1966).
- [63] Group theory of harmonic oscillators and nuclear structure [with P. Kramer]. In: *Group Theory and Applications*. Ed. by E.M. Loebl (Academic Press, 1968).
- [64] Representation of finite U_3 transformations [with E. Chacón]. *Phys. Lett.* **23**, 567 (1966).
- [65] Energy levels of the 4 nucleon system [with P. Kramer]. *Phys. Lett.* **23**, 574 (1966).
- [66] Group theory of harmonic oscillators. IV. Dynamics of the two, three and four particle problem [with P. Kramer]. *Nucl. Phys.* **A107**, 481 (1968).
- [67] Racah coefficients and states with permutational symmetry [with E. Chacón]. In: *Racah Memorial Volume* (North Holland Publishing Co., 1968).
- [68] The harmonic oscillator in atomic and molecular physics. I. General approach and application to atoms and molecules of up to 4 electrons [with O. Novaro]. *J. Chem. Phys.* **48**, 4162 (1968).
- [69] Group theory and nuclear structure. Lectures Notes (ICTP, 1967). In: *Fundamentals of Nuclear Theory* (IAEA, 1967).
- [70] How good is the Hartree-Fock approximation? *Am. J. Phys.* **36**, 52 (1967).
- [71] A general approach to fractional parentage coefficients [with V. Syamala Devi]. *J. Math. Phys.* **10**, 455 (1969).
- [72] Group theory and nuclear structure in the $2s-1d$ -shell. Proceedings of the Tokyo Conference on Nuclear Structure (1967).
- [73] How good is the Born-Oppenheimer approximation? [with C. Kittel] *Proc. Natl. Acad. Sci.* **60**, 1110 (1968).
- [74] Harmonic oscillator states for three particle systems. Applications to the form factor of the proton as a system of three quarks [with V.C. Aguilera-Navarro and W. Yeh]. *Rev. Mex. Fís.* **4**, 241 (1968).
- [75] Harmonic oscillator states and the α particle. I. Form factor for symmetric states in configuration space. *Ann. Phys.* **51**, 312 (1969).
- [76] Harmonic oscillator states and the α particle. II. Configuration space states of arbitrary symmetry [with P. Kramer and V.C. Aguilera-Navarro]. *Ann. Phys.* **54**, 379 (1969).
- [77] *The Harmonic Oscillator in Modern Physics: From Atoms to Quarks*. Gordon & Breach, New York (1969). Russian Translation (MIR, 1972).

- [78] Group theory of harmonic oscillators. V. The harmonic oscillator shell model [with P. Kramer]. *Nucl. Phys.* **A125**, 321 (1969).
- [79] Mechanical models for reactions involving isobaric analogue and doorway states [with P.A. Mello]. *Am. J. Phys.* **39**, 54 (1971).
- [80] Generalization to arbitrary groups of the relations between seniority and quasispin [with C. Quesne]. *Phys. Lett.* **29B**, 482 (1971).
- [81] How good is the Hartree-Fock approximation? II. The case of closed shells [with A. Calles]. *Am. J. Phys.* **38**, 456 (1970).
- [82] Non-invariance groups in the second quantization picture and their applications [with C. Quesne]. *J. Math. Phys.* **11**, 1631 (1970).
- [83] The pseudo-atom, a soluble many body problem [with O. Novaro and A. Calles]. *J. de Physique* **31**, 125 (1970).
- [84] Time dependent behavior of a classical model for reactions involving isobaric analogue states [with P.A. Mello]. *Rev. Mex. Fís.* **19**, 157 (1970).
- [85] Oscillator systems. [with C. Quesne]. Proceedings of the XV Solvay Conference, (Brussels, 1971).
- [86] Group theory and second quantization for non-orthogonal orbitals [with T.H. Seligman]. *Ann. Phys.* **66**, 311 (1971).
- [87] $O(4)$ and $U(3)$ symmetry breaking in the $2s-2p$ -shell [with E. Chacón, O. Novaro and C. Wulfman]. *Phys. Rev.* **3**, 166 (1971).
- [88] Correlation effects in the α particle [with V.C. Aguilera-Navarro]. *Phys. Lett.* **32B**, 336 (1970).
- [89] Transformation brackets for three and four nucleon systems. Proceedings of the Conference on Clustering Phenomena. Bochum (IAEA, 1969).
- [90] Group theory and the few nucleon problem. In: *1968 Cargese Lectures* (Gordon & Breach, 1969).
- [91] Applications of group theory to problems of atomic physics. In: *New Directions of Atomic Physics* (Yale University Press 1971).
- [92] Linear canonical transformations and their unitary representation [with C. Quesne]. *J. Math. Phys.* **12**, 1772 (1971).
- [93] The charge form factor of the mass-3 nuclei [with C. Quesne and A.D. Jackson]. *Rev. Mex. Fís.* **20**, 43 (1971).
- [94] Canonical transformations and matrix elements [with C. Quesne]. *J. Math. Phys.* **12**, 1780 (1971).
- [95] Schematic theory for isobaric analogue states [with P.A. Mello]. *Rev. Mex. Fís.* **19**, 339 (1970).
- [96] Implications of classical ergodicity in quantum mechanics [with P.A. Mello]. *Ann. Phys.* **71**, 1 (1972).
- [97] Canonical transformations and quantum mechanics. Notes of the Latin American School of Physics (México, 1971).
- [98] Canonical transformations and the radial oscillator and Coulomb problems [with T.H. Seligman and K.B. Wolf]. *J. Math. Phys.* **13**, 901 (1972).
- [99] Test of the many electron theory of atoms in an exactly solvable model [with A. Calles and O. Sinanoğlu]. *Phys. Lett.* **40A**, 79 (1972).
- [100] Canonical transformations and quantum mechanics. *SIAM J. Appl. Math.* **25**, 193 (1973).
- [101] Comments on charge distribution in multipion production [with E. Chacón]. *Phys. Rev.* **D7**, 2783 (1973).

- [102] Canonical transformations and accidental degeneracy. I. The anisotropic oscillator [with J.D. Louck and K.B. Wolf]. *J. Math. Phys.* **14**, 692 (1973).
- [103] Canonical transformations and accidental degeneracy. II. The isotropic oscillator in a sector [with J.D. Louck and K.B. Wolf]. *J. Math. Phys.* **14**, 696 (1973).
- [104] Relation between hyperspherical and harmonic oscillator many-body matrix elements [With D. Levi]. *N. Cimento* **204**, 107 (1974).
- [105] An application of linear canonical transformations: Coherent states [with P.A. Mello]. *Rev. Mex. Fís.* **22**, 257 (1973).
- [106] Relation between the hyperspherical harmonic and the harmonic oscillator method for the three body problem [with E. Chacón and D. Levi]. *Rev. Mex. Fís.* **22**, 291 (1973).
- [107] Isotopic spin conservation and charge distribution in multipion production [with J. Patera, R.T. Sharp, and P. Winternitz]. *Phys. Rev.* **D10**, 1587 (1974).
- [108] Canonical transformations and accidental degeneracy. III. A unified approach to the problem [with J. Patera and P. Winternitz]. *J. Math. Phys.* **16**, 82 (1975).
- [109] Complex extensions of canonical transformations and quantum mechanics [with P. Kramer and T.H. Seligman]. *Group Theory its Applications* Ed. by E.M. Loeb. Academic Press, (1975).
- [110] Lie Algebras in the Heisenberg and Schrödinger pictures and two body matrix elements. Proceedings of the 3rd Conference of Group Theoretical Methods in Physics (Marseille, 1973).
- [111] Nonlinear canonical transformations and their representation in quantum mechanics [with P.A. Mello]. *J. Math. Phys.* **16**, 2017 (1975).
- [112] Canonical transformation and accidental degeneracy. IV. Problems with continuous spectra [with J. Patera]. *J. Math. Phys.* **16**, 1866 (1975).
- [113] Equivalence of a class of Wigner coefficients of $SU(1,1)$ with those of $SU(2)$ [with E. Chacón and D. Levi]. *J. Math. Phys.* **16**, 1876 (1975).
- [114] Everything you ever wanted to know about $SU(3) \supset O(3)$ [with J. Patera, R.T. Sharp and P. Winternitz]. *Ann. Phys.* **95**, 139 (1975).
- [115] $U(5) \supset O(5) \supset O(3)$ and the exact solution of the problem of quadruple vibrations of the nucleus [with E. Chacón and R.T. Sharp]. *J. Math. Phys.* **17**, 668 (1976).
- [116] Canonical transformations and their representations in quantum mechanics. Proceedings of the Bonn Conference on Geometrical Quantization (1976).
- [117] Diffraction in time and the time-energy uncertainty relation. *Am. J. Phys.* **44**, 1037 (1976).
- [118] Lie Algebras in the Schrodinger picture and radial integrals [with E. Chacón and D. Levi]. *J. Math. Phys.* **17**, 1919 (1976).
- [119] Group theory of the collective model of the nucleus [with E. Chacón]. *J. Math. Phys.* **18**, 870 (1977).
- [120] Non-bijective canonical transformations and their representation in quantum mechanics [with P. Kramer and T.H. Seligman]. *J. Math. Phys.* **19**, 683 (1978).
- [121] Ambiguities in canonical transformations of classical systems and the spectra of quantum observables [with T. H. Seligman]. Proceedings of the 1977 Bonn Conference on Differential Geometric Methods in Mathematical Physics (Springer Verlag, 1978).
- [122] The gradient formula for the $O(5) \supset O(3)$ chain of groups [with O. Castaños and A. Frank]. *J. Math. Phys.* **19**, 1781 (1978).

- [123] Canonical transformations to action and angle variables and their representation in quantum mechanics [with T.H. Seligman] *Ann. Phys.* **114**, 243 (1978).
- [124] Group theory of the interacting boson model of the nucleus [with O. Castaños, E. Chacón, and A. Frank]. *J. Math. Phys.* **20**, 35 (1979).
- [125] Group theory of the collective model of the nucleus. Proceedings of the Nuclear Physics Conference (Oaxtepec, 1978).
- [126] Nuclear reactions with collective degree of freedom [with E. Aguilera, O. Castaños, and A. Frank]. Proceedings of the Nuclear Physics Conference (Oaxtepec, 1978).
- [127] Canonical transformations to action and angle variables and their representation in quantum mechanics. II. The Coulomb problem [with T.H. Seligman]. *Ann. Phys.* **120**, 430 (1979).
- [128] The ambiguity group for canonical transformations in classical mechanics [with T. H. Seligman]. Proceedings of the Conference on Group Theory and Applications, Austin, Texas. Springer-Verlag, Lecture Notes in Physics, Vol. 97 (1979).
- [129] Quadratic Hamiltonians in phase space and their eigenstates [with P. Winternitz]. *J. Math. Phys.* **21**, 1667 (1980).
- [130] Irreducible decomposition of the direct products of q arbitrary representations of the symplectic group $Sp(2n)$ and its relation with the orthogonal group $O(q)$ [with E. Chacón and P. Winternitz]. *Kinam* **1**, 259 (1979).
- [131] Canonical transformations to action and angle variables and their representation [with T.H. Seligman]. *J. Phys. A.: Math. Gen* **12**, L135 (1979).
- [132] Canonical transformations to action and angle variables. III. The general problem [with T.H. Seligman and J. Deenen]. *Ann. Phys. (N.Y.)* **127**, 458 (1980).
- [133] Confrontation of nuclear collective models. *Nucl. Phys.* **A338**, 156 (1980).
- [134] Decay of a compound particle and the Einstein, Podolsky, and Rosen argument [with J. Flores, E. Henestroza, and P.A. Mello]. *Am. J. Phys.* **49**, 59 (1981).
- [135] Wigner distribution functions and the representation of canonical transformations in quantum mechanics [with G. García-Calderón]. *J. Phys. A: Math. Gen.* **13**, L185 (1980).
- [136] Review of the group theory behind the interacting boson model of the nucleus. In: *Symmetries in Science*, Ed. by B. Gruber and R.S. Millman (Plenum, 1980).
- [137] Group theory and nuclear models. *Kinam* **2**, 79 (1980).
- [138] Group theory and the confrontation of nuclear collective models. In: *Group Theoretical Methods in Physics*. Cocoyoc, 1980. Ed. by K.B. Wolf (Springer-Verlag, Lecture Notes in Physics Vol. 135, 1980) pp. 382–398.
- [139] On the intrinsic shape of nuclei [with E. Chacón and S. Rubinstein]. In: *Group Theoretical Methods in Physics*. Cocoyoc, 1980. Ed. by K.B. Wolf, Springer-Verlag, Lecture Notes in Physics Vol. 135 (1980) pp. 382–398.
- [140] Confrontation of macroscopic and microscopic nuclear collective models [with E. Chacón and V. Vanagas]. *J. Math. Phys.* **22**, 605 (1981).
- [141] On the structure of phase space [with T.H. Seligman]. *J. Math. Phys.* **22**, 1338 (1981).
- [142] Is it possible to define an intrinsic quadrupole moment? Can it be measured? Does it imply a characteristic shape? Proceedings of the 4th Winter Meeting in Nuclear Physics (Oaxtepec, México 1981).

- [143] Canonical transformations relating the oscillator and Coulomb problems and their relevance for collective motions [with T.H. Seligman]. *J. Math. Phys.* **22**, 1526 (1981).
- [144] Dynamical group, eigenstates and matrix elements for the collective Hamiltonian projected from a many body system [with E. Chacón]. *Kinam* **3**, 3 (1981).
- [145] Confrontation of the confrontations of nuclear collective models [with O. Castaños, A. Frank, and P. Hess]. *Phys. Rev.* **C24**, 1367 (1981).
- [146] Group theory and collective degrees of freedom in many body systems. In: *Proceedings of the II International Conference on Recent Progress in Many Body Theories* (Springer-Verlag, 1981).
- [147] Canonical transformations and their representation in quantum mechanics. In: *Group theory and its applications in physics*. Proceedings of the 1980 Latin American School of Physics (American Institute of Physics Conference Proceedings, Vol. 71, 1981) pp.312-349.
- [148] Macroscopic and microscopic nuclear collective Hamiltonians. Their symmetry groups and the canonical transformation relating them. Proceedings of the 1981 Colloquium on Group Theoretical Methods in Physics. *Physica* **114A**, 322 (1982).
- [149] Microscopic derivation of nuclear collective variables [with O. Castaños, E. Chacón, P. Hess, and A. Frank]. *Phys. Rev.* **C25**, 1611 (1982).
- [150] Complete set of states for microscopic nuclear collective models. [with O. Castaños, E. Chacón, A. Frank, and P. Hess]. *J. Math. Phys.* **23**, 2537 (1982).
- [151] Unified approach to nuclear collective models Lecture Notes of the Granada School on the Interacting Boson Model (Springer-Verlag, 1982).
- [152] Does accidental degeneracy imply a symmetry group [with C. Quesne]. *Ann. Phys.* **148**, 462 (1983).
- [153] Relativistic collective variables for many body systems [with P.O. Hess, W. Greiner, and G. Schmidt]. *J. Phys. G: Nucl. Phys.* **8**, L179 (1982).
- [154] Accidental degeneracies and symmetry groups. *Found. Phys.* **13**, 73 (1983).
- [155] $SU(3)$ and $SU(5)$ dynamical symmetries in the extended interacting boson model [with Sun Hong-Zhou, A. Frank, and P. van Isacker]. *Kinam*, **5**, 135 (1983).
- [156] A hidden symmetry in collective excitations of many body systems [with O. Castaños and A. Frank]. Group Theoretical Methods in Physics Proceedings, Istanbul, Turkey, 1983. Springer-Verlag, Lecture Notes in Physics Vol. 180, (1983).
- [157] Collectivity and Geometry. I. General Approach. *J. Math. Phys.* **25**, 1555 (1984).
- [158] Collectivity and Geometry. II. The two dimensional case [with E. Chacón and P. Hess]. *J. Math. Phys.* **25**, 1565 (1984).
- [159] Collectivity and Geometry. III. the three dimensional case in the $Sp(6) \supset Sp(2) \times O(3)$ chain for closed shells [with O. Castaños and E. Chacón]. *J. Math. Phys.* **25**, 2815 (1984).
- [160] Geometry of Nuclear Collective Motions. Proceedings of Group Theoretical Methods in Physics, Trieste, 1983. Springer-Verlag, Lecture Notes in Physics Vol. 201 (1984).
- [161] Analytic expressions for the matrix elements of the generators of $Sp(6)$ in the $Sp(6) \supset U(3)$ basis [with O. Castaños and E. Chacón]. *J. Math. Phys.* **25**, 1211 (1984).
- [162] Accidental degeneracies in the Zeeman effect and the symmetry groups [with N. Méndez, E. Murow, and J.W.B. Hughes]. *Ann. Phys.* **155**, 231 (1984).
- [163] Pseudoatoms and atoms in strong magnetic fields [with N. Méndez and E. Murow]. *Ann. Phys.* **163**, 1 (1985).

- [164] Symmetry constrained bosons and collectivity. *Nucl. Phys.* **A421**, 81 (1984).
- [165] Constrained bosons for collective states in open shell nuclei [with E. Chacón and O. Castaños]. Proceedings of the XIII Colloquium on Group Theoretical Methods in Physics, University of Maryland (World Publishing Co., Singapore, 1984).
- [166] Boson realization of $Sp(4)$. I. The matrix formulation [with O. Castaños, E. Chacón, and C. Quesne]. *J. Math. Phys.* **26**, 2107 (1985).
- [167] Boson realization of symplectic algebras *J. Phys. A: Math. Gen.* **18**, 21 (1985).
- [168] Are there boson degrees of freedom in collective shell model states? Proceedings of the Drexel Conference on Nuclear Shell Model Theory (World Publishing Co., Singapore, 1984).
- [169] Generating kernel for boson realization of symplectic algebras [with O. Castaños and P. Kramer]. *J. Phys. A: Math. Gen.* **18**, L493 (1985).
- [170] Boson realization of $sp(4, R)$. II. The generating kernel formulation [with O. Castaños and P. Kramer]. *J. Math. Phys.* **27**, 924 (1986).
- [171] Accidental degeneracy and symmetry Lie algebras [with R. Dirl]. *J. Phys. A: Math. Gen.* **18**, 2423 (1985).
- [172] Collectivity and Geometry. IV. $Sp(6) \supset Sp(2) \times O(3)$ basis states for open shells [with R.T. Sharp and M. Nicolescu]. *J. Math. Phys.* **26**, 2995 (1985).
- [173] Canonical transformations to action and angle variables and their representation in quantum mechanics. IV. Periodic potentials [with J. Flores, G. López, and G. Monsiváis]. *Ann. Phys.* **172**, 156 (1986).
- [174] Critical analysis of algebraic collective models. Proceedings of the Dubrovnik Conference on Nuclear Structure, Reactions and Symmetries (World Scientific Vol.2, 1986) pp. 981–986.
- [175] Structure of phase space and quantum mechanics. Proceedings of the Phase Space Conference, Maryland (World Scientific, 1986).
- [176] Matrix representation of the generators of symplectic algebras. I. The case of $Sp(4, R)$ [with O. Castaños]. *J. Phys. A: Math. Gen.* **20**, 513 (1987).
- [177] Matrix representation of the generators of symplectic algebras. II. The general case with explicit results for $Sp(6, R)$ [with E. Chacón]. *J. Phys. A: Math. Gen.* **20** (1987).
- [178] Collectivity and Geometry. V. Spectra and shapes in the two dimensional case [with E. Chacón and P. Hess]. *J. Math. Phys.* **28**, 2223 (1987).
- [179] Group theory of the symplectic nuclear model. Proceedings of the Nuclear Physics Conference (Oaxtepec, 1987)
- [180] Stability of deuterons in strong magnetic fields [with G. Loyola]. *Mod. Phys. Lett. A (Singapore)* **3**, 3435 (1988).
- [181] Stability of nuclei in strong magnetic fields Proceedings of the Nuclear Physics Conference (Oaxtepec, 1988) p. 233.
- [182] Collectivity and geometry VI. Spectra and shapes in the three dimensional case [with E. Chacón and P. O. Hess]. *J. Math. Phys.* **30**, 970 (1989).
- [183] Wigner distribution functions and the representation of non-bijective canonical transformations in quantum mechanics [with R. Dirl and P. Kasperkovitz]. *J. Phys.* **A21**, 1835 (1988).
- [184] Collectivity and geometry. In: *Modern Developments in Nuclear Physics*, Novosibirsk Conference on Contemporary Problems in Nuclear Structure Physics, 1987. Ed. by O.P. Sushkov. (World Scientific, Singapore, 1988) p. 353.

- [185] The symplectic nuclear model. Proceedings of the Varna Conference on Group Theoretical Methods in Physics. Springer-Verlag, Lecture Notes in Physics Vol. 313 (1988) p. 414.
- [186] Las tres caras de la espectroscopía: atómica, nuclear y sub-nuclear [with A. Sánchez]. *Rev. Mex. Fís.* **34**, 511 (1988).
- [187] Relativistic symplectic model for scalar-quark systems. Proceedings of the Conference on Space-Time Symmetries. *Nucl. Phys. B (Proc. Suppl.)* **6**, 76 (1989).
- [188] Coherent states and accidental degeneracy for a charged particle in a magnetic field [with G. Loyola and A. Szczepaniak]. *Am. J. Phys.* **57**, 811 (1989).
- [189] Accidental degeneracy and the structure of matter in strong magnetic fields [with G. Loyola and A. Szczepaniak]. In: *Symmetry in Science III* (Plenum Press, 1989) pp. 311–322.
- [190] The Dirac oscillator [with A. Szczepaniak]. *J. Phys. A: Math Gen.* **22**, L817 (1989).
- [191] The two body Dirac oscillator [with G. Loyola and A. Szczepaniak]. Anniversary Volume in Honor of J.J. Giambiaggi (World Scientific, Singapore, 1990).
- [192] The Dirac oscillator and its contribution to the baryon mass formula [with G. Loyola, A. Szczepaniak, C. Villegas, and N. Aquino]. Proceedings of the Rio de Janeiro International Workshop on Relativistic Aspects of Nuclear Physics (World Scientific, Singapore, 1990) pp. 271–307.
- [193] Symmetry Lie algebra of the Dirac oscillator [with C. Quesne]. *J. Phys. A: Math. Gen.* **23**, 2263 (1990).
- [194] Art or Science: The symmetry Lie algebra for a Hamiltonian with accidental degeneracy [with C. Quesne and G. Loyola]. *Ann. Phys.* **198**, 103 (1990).
- [195] Relativistic mass formula for baryons [with G. Loyola and C. Villegas]. Proceedings of the XIII Oaxtepec Conference on Nuclear Physics (1990) pp. 187–196.
- [196] Anomalous basis for representations of the Poincaré Group [with G. Loyola and C. Villegas]. *J. Math Phys.* **32**, 373 (1991).
- [197] Comparison between perturbative and exact transitions induced by an interaction [with G. Loyola, C. Villegas]. *Rev. Mex. Fís.* **37**, 369 (1991).
- [198] Exact time dependent transitions to negative energy states, due to an interaction [with G. Loyola and C. Villegas]. Festschrift In Honor of the 70th birthday of Jayme Tiomno (World Scientific, 1990). pp. 76–88.
- [199] Dynamical model for heavy ion collisions with a single resonance [with G. Loyola and C. Villegas]. *Phys. Rev. C* **43**, 311 (1991).
- [200] Relativistic invariance of a many body system with a Dirac oscillator interaction [with G. Loyola and C. Villegas]. Proceedings of Moscow Colloquium on Group Theory and its Applications (Springer-Verlag, Lecture Notes in Physics Vol. 382, 1991.) pp. 339–345.
- [201] The decay process: an exactly soluble example and its implications, *Symmetries in Physics*, Cocoyoc 1991, Ed. A. Frank and B. Wolf, Springer-Verlag [with G. García Calderón and G. Loyola] pp. 273–292.
- [202] Universal symmetry Lie algebras for classical two dimensional Hamiltonians and their translation to quantum mechanics, *Physics Letters A*, **152**, 128 (1991) [with C. Quesne.]
- [203] A Dirac equation with an oscillator potential and spin-orbit coupling, *Phys. Letters A*, **158**, 19 (1991) [with V. Kukulín and G. Loyola.]
- [204] Relativistic interactions by means of boundary conditions: The Breit-Wigner formula, *J. Math. Phys.* **32**, 3519 (1991) [with G. López-Laurrabaquío.]

- [205] Transformation from $U(3)$ to pseudo $U(3)$ basis. Seminar in Honor of K. T. Hecht, on Symmetries in nuclear physics. (World Scientific 1992, Ed. J. P. Draayer, J. Janecke). Ann Arbor 1991, [with O. Castaños and C. Quesne] also in *Phys. Letters B* **277**, 238 (1992).
- [206] Barut equation and the particle-antiparticle system with a Dirac oscillator interaction, [with G. Loyola], *Foundations of Physics*, **23**, 197 (1993).
- [207] Mass spectra for the particle-antiparticle system with a Dirac oscillator interaction, [with G. Loyola] in Proc. of the Harmonic Oscillator Workshop, University of Maryland NASA Publications, **3197**, pp. 405-427.
- [208] Comparison of perturbative and variational procedures in a relativistic problem, [with L. Benet, G. Loyola and A. Salinas], *Rev. Mex. Fís.* **38**, 778 (1992).
- [209] Quantum groups and the recovery of $U(3)$ symmetry for the Hamiltonian of the nuclear shell model, [with A. Del Sol Mesa, G. Loyola, V. Velázquez], *J. Phys. A: Math. Gen.* **26**, 1147 (1993).
- [210] Penetrability of a one-dimensional Coulomb potential, *J. Phys. A: Math. Gen.* **26**, 2445 (1993).
- [211] Time dependent model for heavy ion collisions with a single resonance [with G. Loyola and J. L. Mateos]. Proceedings of the 14th Oaxtepec Conference on Nuclear Physics (World Scientific 1991) pp. 147-157.
- [212] The Dirac oscillator and the mass formula of baryons. Editor B. Gruber, (Plenum Press, 1993) pp. 503-514.
- [213] Relativistic Breit-Wigner formula and its applications, Hadron 91, Eds. S. Oneda and D. C. Peaslee (World Scientific 1992) pp. 342-361.
- [214] Relations between the nuclear shell model Hamiltonian and the orthosymplectic super algebra $Osp(1/2)$, [with A.B. Balantekin and O. Castaños] *Phys. Lett. B* **284**, 1 (1992).
- [215] Transformation from a $U(3)$ to pseudo $U(3)$ basis of the matrix representation of a deformed Nilsson Hamiltonian [with A. Del Sol Mesa] *Rev. Mex. Fís.* **38**, Suplemento 2, 146 (1992).
- [216] Quantum groups and the Hamiltonian of the nuclear shell model [with A. Del Sol Mesa] Proceedings of the Symposium on Group Theoretical Methods in Physics, Salamanca, España (1992).
- [217] Relativistic complexity in physics, Proceedings of the Pontifical Academy of Sciences on “The emergence of complexity in mathematics, physics, chemistry and biology” (Vatican Press 1992).
- [218] Relation between decay and delay times [with G. García-Calderón and J. L. Mateos] *Rev. Mex. Fís.* **39**, Suplemento 2, 76 (1993).
- [219] Aspects of the relativistic two body problem (with A. Del Sol Mesa and Yu. F. Smirnov) Proceedings of the Third Wigner Symposium, Oxford, England 1993.
- [220] Radial equation for the particle-antiparticle system with a Dirac oscillator interaction and a qualitative application to mesons [with A. González García and G. Loyola] *Rev. Mex. Fís.* **40**, 12 (1994)
- [221] Relations between different approaches to the relativistic two body problem [with A. Del Sol Mesa] *J. Phys. A: Math. Gen.* **27**, 4685 (1994).
- [222] A relativistic cockroach nest, [with A. Del Sol Mesa] *Can. J. Phys.* **72**, 453 (1994).
- [223] Description of survival and non-escape probabilities [with G. García-Calderón and J. L. Mateos] *Rev. Mex. Fís.* **40**, Suplemento 1, 155 (1994).
- [224] Response to a comment on “Penetrability of a one dimensional Coulomb potential” by R. G. Newton, *J. Phys. A: Math. Gen.* **27**, 4719 (1994).

- [225] Symmetry superalgebras for the two body Dirac oscillator. [with C. Quesne and Yu. F. Smirnov] Proceedings of the International Conference on Group Theoretical Methods in Physics, (Osaka, Japan 1994).
- [226] Alternative sources of energy in developing countries; The case of México, Congress of the Pontifical Academy of Sciences (Vatican Press, 1994).
- [227] Modern applications of the harmonic oscillator [with Yu. F. Smirnov] Proceedings of the Joint Congress of the Canadian, American and Mexican Physical Societies (Cancun, 1995)
- [228] Resonant spectra and the time evolution of the survival and non-escape probabilities [with G. García-Calderón and J. L. Mateos] *Phys. Rev. Lett.* **74**, 337 (1995).
- [229] Supersymmetry and superalgebra for the two body system with a Dirac oscillator interaction [with C. Quesne and Yu. F. Smirnov] *Phys. A: Math. Gen.* **28**, 6447 (1995).
- [230] Polar optical oscillators in quantum wires and free standing wires in the electron phonon interaction Hamiltonians [with F. Comas, A. Catarero, C. Trallero G] *J. Phys. Condensed Matter* **7**, 1789 (1995).
- [231] Symmetry Lie algebra of the two body system with Dirac oscillator interaction [with A. del Sol Mesa and Yu. F. Smirnov] *Rev. Mex. Fís* **41**, 322 (1995).
- [232] Variational procedures for resonant states [with A. García-Zenteno and Yu. F. Smirnov] *Rev. Mex. Fís.* **41** 5147 (1995).
- [233] Basis of irreps of the chain of Lie algebras $sp(6) \supset sp(4) \oplus su(2) \supset su(2) \oplus su(2) \oplus su(2)$ [with E. Chacón], Memorias del Congreso en Honor del 70 Aniversario de Paulo Leal Ferreira, Sao Paulo, Brasil, 1995.
- [234] Barut procedure for the relativistic many body problem versus other approaches. Proceedings of IV Wigner Symposium, Guadalajara, México. 1995.
- [235] Group Theory and the relativistic many body problem. Latin American School of Physics XXX ELAF on Group Theory and its applications. México. City 1995. (AIP Conference Proceedings) pp. 279-310.
- [236] Validity of variational procedures for resonant states [with A. García Zenteno and Yu. F. Smirnov.] *Am. J. Phys.* **64**, 593 (1996).
- [237] Diffraction in time in Kronig-Penney Lattice [with G. Monsivais y G. Loyola.] *Physica Scripta* **54**, 216 (1996)
- [238] The Dirac oscillator of arbitrary spin [with A. del Sol Mesa] *J. Phys. A: Math Gen* **29** 4217 (1996)
- [239] Survival and non-escape probabilities for resonant and non-resonant decay [with J.L. Mateos and G. García-Calderón] *Ann. Phys. (N. Y.)* **249** 430 (1996)
- [240] Supermultiplets and relativistic problems
I. The free particle with arbitrary spin in a magnetic field [with Yu F Smirnov.] *J. Phys. A: Math Gen* **29** 6027 (1996)
- [241] Supermultiplet formulation of the Dirac oscillator of arbitrary spin [with Yu. F. Smirnov], en las memorias del Congreso sobre Simetrías, Bregenz, Agosto de 1996, Plenum Press.
- [242] Relativistic equation for a particle of arbitrary spin in a magnetic field [with Yu. F. Smirnov], en las memorias del Congreso sobre Teoría de Grupos y sus Aplicaciones, Goslar, Alemania, Julio de 1996.
- [243] Ecuaciones relativistas para partícula libre de spin arbitrario en un número de la Revista mexicana de Física que contiene las memorias del Congreso de Oaxaca de la Sociedad Mexicana de Física. Octubre de 1996.
- [244] Delay time in the R matrix formalism. XX Nuclear Physics Symposium, Oaxtepec. To appear in Supplement of Rev. Mex. Fís. 1997.

- [245] The relativistic oscillator and the mass formula of Baryons. Proceedings of the Conference in honor of the 60th birthday of J. Patera and P. Winternitz, to be published by the Université de Montreal, 1997.
- [246] Delay time for a single resonance [with G. Monsivais] *J. Phys. G. Nucl. Part. Phys.* **23**, 573 (1997).
- [247] Supermultiplicity and the relativistic Coulomb problem with arbitrary spin. [with A. del Sol Mesa and V. Riquer]. *Foundation of Physics*, **27**, 1139 (1997).
- [248] Variational energy spectra of relativistic Hamiltonians [with Anju Sharma], *J. Phys. A: Math. Gen.* **31**, 397 (1998).
- [249] Variational analysis of an exactly soluble relativistic oscillator [with Anju Sharma], in *Symmetries in Physics X* (Plenum Press New York 1998).
- [250] Supermultiplets and relativistic problems. II. The Bhabha equation of arbitrary spin and its properties [with A. G. Nikitin, A. Sharma and Yu. F. Smirnov] *J. Phys. A: Math. Gen.* **31**, 6045 (1998).
- [251] Analysis of relativistic particles of arbitrary spin through different chains of groups [with A. G. Nikitin, A. Sharma and Yu. F. Smirnov] *Rev. Mex. Fís.* **44**, Supl. 2, 1 (1998).
- [252] Exact analytic solution of the Schroedinger equation with centrifugal tensor forces. [with J. Besprosvany] *Phys. Rev. A* **57**, 4401 (1998).
- [253] The Hamiltonian for a relativistic particle with arbitrary spin in a central potential. 5th. Wigner Symposium, Ed. P. Kasperkovitz & D. Gau. (World Scientific, Singapore 1998). p. 468.
- [254] Supermultiplets and relativistic problems. Proceedings of the International Group Theory Conference, Hobart, Australia, 1998.
- [255] Topics in quantum mechanics. Escuela Latino Americana de Física 1998. Por publicarse por el American Institute of Physics.
- [256] Diffraction in time in terms of Wigner distributions and tomographic probabilities [with A. Man'ko and A. Sharma]. *Phys. Rev. A.* **59**, 1809 (1999).
- [257] The Kronig-Penney lattice with R matrix interactions [with G. Monsivais]. *J. Phys. A: Math. Gen.* **32** 3637 (1999).
- [258] Neutron transmission bands in one dimensional lattices [with G. Monsivais]. *Rev. Mex. Fís.* **45**, Supl. 2, 21 (1999).
- [259] Matrix representation of the two body relativistic problem in [with V. Riquer] "Quantum theory and Symmetries", Proceedings of Conference in honour of Prof. Doebner, Goslar, Alemania (1999),
- [260] The harmonic oscillator in quantum theory. A powerful bridge in physics. Publication of the Indian Academy of Sciences, Editor A. Mitra (1999).
- [261] Retraso temporal en el formalismo de la matrix R. En el libro editado por Esbaide Adem y dedicado al Dr. Angel Dacal, Fondo de Cultura Económica (1999). pp. 195-203.
- [262] Canonical transformations for time evolution and their representation in Wigner distribution space" [with A. Sharma] *Annals of Physics* **282**, (2000). pp. 138-153
- [263] Matrix representation of a Sturm-Coulomb in a magnetic field and its implications", [with H.Hernández-Saldaña]. *Rev. Mex. Fís.* **46**, Suplemento 1, (2000).
- [264] The Sturm coulomb problem in a magnetic field and its implications for quantum chaos" [with H.Hernández-Saldaña y A. Suárez-Moreno]. Proceedings of the Dubna Conference on Group Theoretical Methods in Physics, August, 2000. Appeared in *Physics of Atomic Nuclei* **65**, 976-983 (2002).
- [265] Diffraction in time with dissipation" [with D. Schuch] *J. Phys. A: Math. Gen* **34**, 4217, (2001).

- [266] Motion of wave packets with dissipation” [with Shuch D., Suarez Moreno] *Rev. Mex. de Fís.* **47**, Suplemento 2, 7 (2001).
- [267] Baryons in O(4) and the Vibron model” [with Kirchbach M., Smirnov Yu F.] *Phys Rev, D* **64**, 114005 (2001).
- [268] The quark-diquark rovibron and baryon spectra” [with Kirchbach M., Smirnov Yu F.] *Acta Physica Hungarica A: Heavy Ion Physics* **16**, 93-103, No. 1-4 (2002).
- [269] The spectra of a hamiltonian with a linear radial potential derived by a variational calculation based on harmonic oscillator states [with Suárez Moreno A.] *Rev. Mex. Fís.* **48**, 39 (2002).
- [270] The two body problem with spin in relativistic quantum mechanics: The case of positronium” [with V. Riquer] *J. Phys. A: Math. Gen.* **35**, 8467 (2002).
- [271] The non-relativistic energy spectra of quark-antiquark systems [with V. Riquer] *Rev. Mex. Fís.* **48** Supl. 2, p. 37-40 (2002).
- [272] Transient effects in Wigner distribution phase space of a scattering problem Conference in Memory of Robert Sharp. CRM Proceedings and Lecture Notes, Editors P. Winternitz et al. American Mathematical Society, Volume **34**, 2004, p. 153
- [273] Reply to Comment on Resonant Spectra and the time evolution of the survival and nonscape probabilities [with García-Calderón and Mateos] *J. Phys. Rev. Lett.* **90**, No. 2 028901-1/028902-1 (2003).
- [274] The relativistic many body problem and applications to bottomonium [with V. Riquer] *J. Phys. A: Math. Gen.* **36**, 2163 (2003).
- [275] Two aspects of the time energy uncertainty relation Squeezed States and Uncertainty relations, Proceedings of the 8th International Conference. Rinton Press 293-300, (2003).
- [276] Relativistic correction to order $(1/c^2)$ of the ground state of the deuteron [with Suárez Moreno A.]. *Rev Mex. Fís.*, **49**, Supl. 4, 2003, 77-81.
- [277] Coherent states and disipation for a motion of a charged particle in a magnetic field [with D. Schuch] *J. Phys. A: Math. Gen.* **36**, 01, 6571 (2003).
- [278] The work of Jerry Draayer. Computational and Group-Theoretical Methods in Nuclear Physics. Proceedings of the Symposium in Honor of Jerry P Draayer’s 60th Birthday. World Scientific Publishing Co. 3-15 (2004).
- [279] The relativistic many body problem in quantum mechanics. B. Gruber (ed.), Symmetries in Science XI, Kluwer Academic Publishers. 37-43, (2003)
- [280] Derivation of the generators of the pseudo SU(3) symmetry group of heavy nuclei in the shell model picture. Ed. Roelof Bijker, Richar F. Casten, Alejandro Frank American. Institute of Physics. Conference Proceedings Volume 726, 19-23 (2004)
- [281] The many body problem in relativistic quantum mechanics [with A. Nikitin] Supl. 2 *Rev. Mex. de Fís.* **50 S2**, p. 66-73, (2004)
- [282] Composite particles in relativistic quantum mechanics and their application to three quark systems [with E. Sadurní] Group Theoretical Methods in Physics. Ed. G. S. Pogosyan, L. E. Vicent, K. B. Wolf. Institute of Physics Publishing Ltd. (UK) (en prensa 2004)
- [283] Transient effects in two channel interactions and an application to the behavior of a time dependent shutter Supl. 2 *Rev. Mex. de Fís.* **50**, p. 66-73. (2004)
- [284] Tunnelling out of a time-dependent well [with T. Kramer] *J. Phys. A: Math. Gen.* **38** 5993-6003 (2005)
- [285] Transient phenomena in quantum mechanics [with S. Godoy and T. Kramer] {it Rev. Mex. Fís (2005).

- [286] Transient phenomena in quantum mechanics “Diffraction in time” Conference *Paths of Discovery*, Pontifical Academy of Sciences, Rome, It. 4-8 November (2004). (en prensa).
- [287] Transient effects in two channel interactions and an application to the behavior of a time dependent shutter [with T. Kramer] *Rev. Mex. Fis.* **51** # **4**, pp. 407-414 (2005).
- [288] Transient phenomena in quantum bound states subjected to a sudden perturbation [with E. Sadurní] *SIGMA*, **1**Paper 003, 9 pages (2005).
- [289] Transition from quantum to classical behavior for some simple model systems” [with D. Schuch] *Rev. Mex. Fs* **51** # **5**, pp. 516-524 (2005).
- [290] Propagator for quantum systems involving spin orbit coupling [with E. sadurní] *J. Phys. A: Math. and Gen* **39** pp. 7039-7050 (2006).
- [291] Connection between quantum-mechanical and classical evolution via a dynamical invariant [with D. Schuch] *Physical Review a* **73**, pp. 1 (2006).
- [292] Time dependent problems in relativistic quantum mechanics [with E. Sadurní] *Rev. Mex. Fs* **S52** # **4**, pp. 74-76 (2006).
- [293] Time modulation of atom sources [with A del Campo, JG Muga] *J. Phys. B: At. Mol. Opt. Phys.* **40** 975-987 (2007)