On the scope and importance of the *Revista Mexicana de Física* in the Mexican and Latin American Physical Science Community

F. Ramos-Gómez [a] and Raúl Espejel-Morales [b]
Departamento de Física, Facultad de Ciencias, Universidad Nacional Autónoma de México, Circuito Exterior, Ciudad Universitaria, D.F., México, 04510, México.
[a] *Chief Editor and* [b] *Technical Editor of Revista Mexicana de Física*

We analyze the scope and importance that the *Revista Mexicana de Física* (RMF) has had in the Mexican and Latin American physical science community, from two points of view: the author(s) institution and the different fields within physics of the published papers over a five years period (2007–2011). We find that almost every Mexican scientific institution that does research in physical science has published in RMF over the mentioned period. The presence of other Latin American institutions is also illustrated. We also show the great diversity of fields (according to the declared *PACS*® codes) covered in the RMF papers, which confirms the general physics nature of our journal.

Keywords: Author institution; fields covered; Revista Mexicana de Física

PACS: 00.01

1. Introduction

Practically from its beginnings [1], the *Revista Mexicana de Física* (RMF) was intended as an international scientific journal, where the physical science community in México –and Latin America, without excluding anyone from the scientific world- could present the results of their research work. This is one of the main reasons why the publisher, the Mexican Physical Society –or Sociedad Mexicana de Física (SMF)–, has made every effort to maintain the RMF as a free and open access journal. Accordingly, at present, the RMF can be freely consulted in our Web Page (`http://rmf.smf.mx`). Also, since there is no publication fee, a paper is published depending only on its merits as judged by specialized, independent and anonymous referees.

With that in mind, as RMF –Chief and Technical– editors, we have considered pertinent to analyze the scope and importance that our journal has had in the Mexican and Latin American physical science community, from two points of view: authors institution and fields of published papers. The purpose of this work is to present the results of our analysis which covered a five years span (2007–2011).

2. Fields of *Revista Mexicana de Física* papers (2007–2011)

Throughout the period 2007–2011, RMF published 372 papers on 54 fields (see below), written by 1252 authors from 60 Mexican institutions, plus institutions from 8 Latin American and 18 other countries. Of course some authors published more than one paper and some reported being part of more than one institution.

For the present work we took advantage of the RMF policy that requires any researcher submitting a manuscript, to suggest the applicable codes from the *Physics and Astronomy Classification Scheme*® (*PACS*®), which is a hierarchical subject classification scheme, designed by the American Institute of Physics [2] (AIP) to classify and categorize the literature of physics and astronomy (a brief description of *PACS*® can be found in the Appendix 1; for more details see reference 2).

So, we added up the papers published in RMF according to their declared *PACS*® codes over the mentioned 2007–2011 span. Our results are shown in figure 1 (for those not

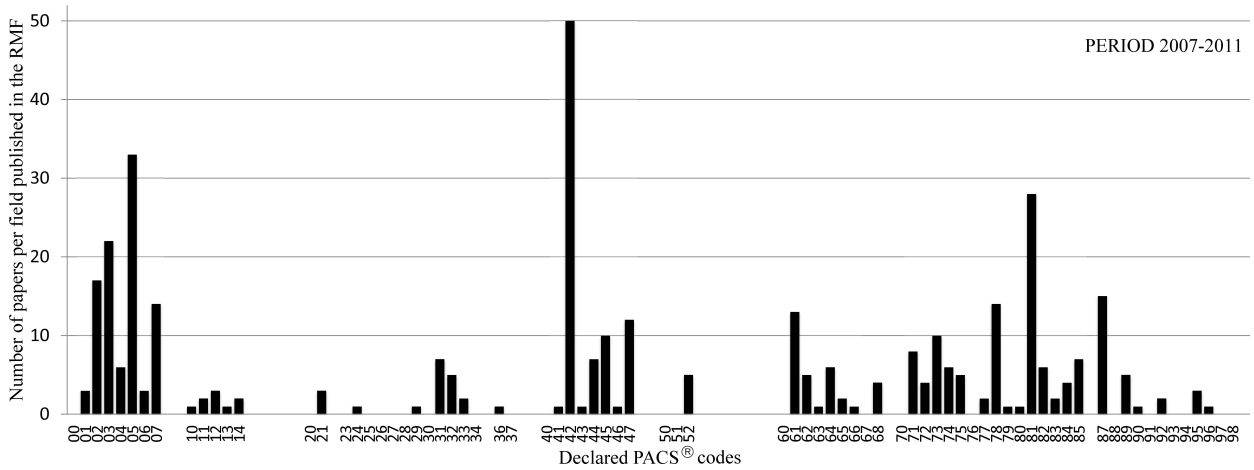

FIGURE 1. Number of papers per field, according to the applicable codes from the *Physics and Astronomy Classification Scheme*® (*PACS*®), published in *Revista Mexicana de Física* over the period 2007–2011. For details on *PACS*® see Appendix 1.

familiar with *PACS*® codes we recommend reviewing Appendix 1 first).

An overview of figure 1 confirms the general physics character of our journal. It should be noted the wide variety of fields (codes 00 to 09) covered and the dominant presence of the following fields, as defined by the *PACS*® codes:

00. General
    - 02. Mathematical methods in physics.
    - 03. Quantum mechanics, field theories, and special relativity.
    - 04. General relativity and gravitation.
    - 05. Statistical physics, thermodynamics, and nonlinear dynamical systems.
    - 07. Instruments, apparatus, and components common to several branches of physics and astronomy.

30. Atomic and Molecular Physics
    - 31. Electronic structure of atoms and molecules: theory.
    - 32. Atomic properties and interactions with photons.

40. Electromagnetism, Optics, Acoustics, Heat Transfer, Classical Mechanics, and Fluid Dynamics
    - 42. Optics.
    - 44. Heat transfer.
    - 45. Classical mechanics of discrete systems.
    - 47. Fluid dynamics.

50. Physics of Gases, Plasmas, and Electric Discharges
    - 52. Physics of plasmas and electric discharges.

60. Condensed Matter: Structural, Mechanical and Thermal Properties
    - 61. Structure of solids and liquids; crystallography.
    - 62. Mechanical and acoustical properties of condensed matter.
    - 64. Equations of state, phase equilibria, and phase transitions.

70. Condensed Matter: Electronic Structure, Electrical, Magnetic, and Optical Properties
    - 71. Electronic structure of bulk materials.
    - 72. Electronic transport in condensed matter.
    - 73. Electronic structure and electrical properties of surfaces, interfaces, thin films, and low-dimensional structures.
    - 74. Superconductivity.
    - 78. Optical properties, condensed-matter spectroscopy and other interactions of radiation and particles with condensed matter.

80. Interdisciplinary Physics and Related Areas of Science and Technology
    - 81. Materials science.
    - 82. Physical chemistry and chemical physics.
    - 84. Electronics; radiowave and microwave technology; direct energy conversion and storage.
    - 85. Electronic and magnetic devices; microelectronics.
    - 87. Biological and medical physics.
    - 89. Other areas of applied and interdisciplinary physics.

As far as the main categories (codes) are concerned, we mark out the robust presence in the RMF of papers related to condensed matter: labeled as code 60 (Condensed Matter: Structural, Mechanical and Thermal Properties); and code 70 (Condensed Matter: Electronic Structure, Electrical, Magnetic, and Optical Properties). They should probably be considered together with the strongly present subject 81 (Materials science).

Among more specific subjects not included in the categories mentioned above, it is important to emphasize the strong presence of Optics (code 42), which in our case should be considered together with the also frequently present subject involved in code 07 (Instruments, apparatus, and components common to several branches of physics and astronomy), for most instruments in this category are related to optics.

Also in figure 1 we recognize the strong presence of subjects such as (in that order):

05. Statistical physics, thermodynamics, and nonlinear dynamical systems
87. Biological and medical physics
03. Quantum mechanics, field theories, and special relativity
02. Mathematical methods in physics.

For the sake of completeness, in figure 1 we included fields with a relatively small incidence of papers in our journal. In some cases this comes as a result of the existence of a specialized journal in México (*Revista Mexicana de Astronomía y Astrofísica* is an example); or the small size of the community in that specific subject in México; or the strong tradition of using journals outside of México; among other reasons. On the other hand, It should be mentioned that some of the subjects with a slight presence have recently begun to grow in our journal.

3. The presence of Institutions in Revista Mexicana de Fisica (2007–2011).

We have also analyzed the importance of RMF to research institutions in México and Latin America, as seen from the number of the author(s) of published papers from each institution. In doing so, we faced the problem of papers having several authors, which in some cases belong to diverse institutions. As it is usually done in most institutions when they report their published papers, we decided to credit an institution with a published paper for each author that belongs to its staff. That is: if a paper had two authors from institution A and three authors from institution B, then institutions A and B were credited with two and three published papers respectively. We considered this a better way to show the institutional importance than dividing credit among authors

and institutions; this means of course that the credited papers are more than the published ones in the RMF.

So, we went over the published papers in the period 2007–2001, check for the author(s) institution and added them up as mentioned above. For the sake of clarity we separated the results for Mexican institutions and Latin American countries.

3.1. Mexican institutions

The complete list of Mexican institutions that published in the RMF (2007–2011) can be seen (with their acronym) in Appendix 2. Some were disaggregated in their units due to the units geographic -or organic- separation, or to the magnitude (number of credited papers) of their contribution (examples: UNAM, IPN, CINVESTAV, BUAP, and others).

Figure 2 shows the number of papers credited per institution for the complete group of Mexican institutions that published in the RMF.

We can see that 60 institutions (more than 100 with disaggregation) have members that published at least one paper in RMF. That is, most universities, centers, institutes and other institutions that do research in physical science in Mexico have published in the RMF within the past five years.

In figure 3 we show the number of papers credited per institution, considering only institutions (without their units disaggregated) that were credited with at least ten papers published in RMF in the referred span. With this criterion we found 23 contributors and the main ones were: UNAM, IPN, CINVESTAV, BUAP, INAOE, CIO, UAM, UGTO, CICESE, UASLP, USON.

Figure 4 shows our results when contributing institutions are disaggregated in their units. In this case the main contributors turned out to be: IF-UNAM, INAOE, CINVESTAV-DF, CIO, ESFM-IPN, CICATA-IPN, ESIME-IPN, UGTO, IIMUNAM, FCFM-BUAP, UASLP, CECADET-UNAM, and CICESE-EN.

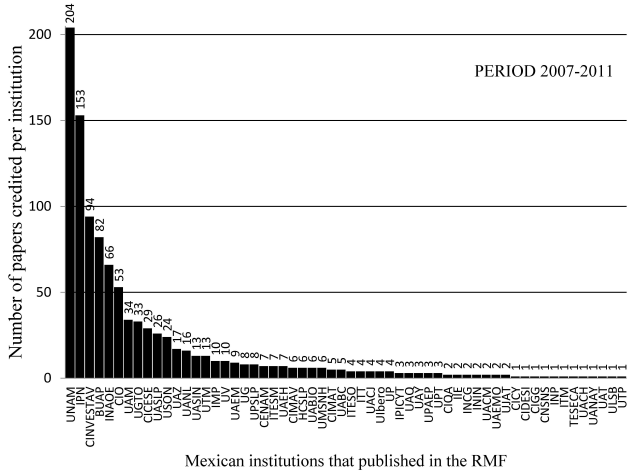

FIGURE 2. Number of papers credited per institution for the complete group of Mexican institutions that published in the *Revista Mexicana de Física* over the period 2007–2011. For details on Mexican institutions see Appendix 2.

Therefore, figures 2-4 show the significant presence that the RMF has had over the past five years, particularly in the main institutions that do research in physical science in Mexico.

3.2. RMF presence in Latin American (and other) countries

While going over the period 2007–2011, we found a smaller but significant number of authors associated with non Mexican institutions from Latin American countries. In this case we grouped our results by countries. So, figure 5 shows number of papers credited per country which results from adding up those credited to their respective institutions.

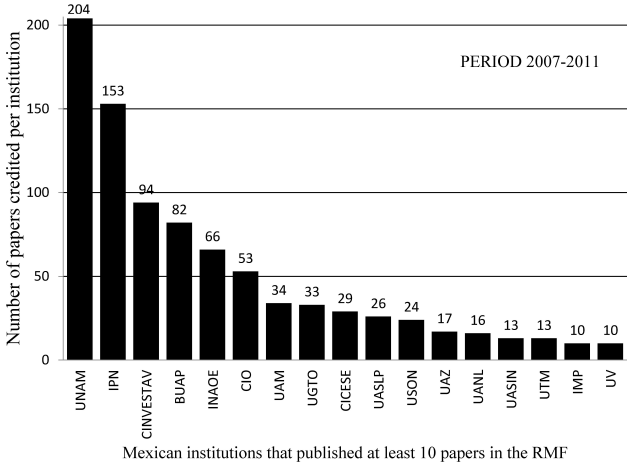

FIGURE 3. Number of papers credited per institution, without their units disaggregated, with at least ten papers published in the *Revista Mexicana de Física* over the period 2007–2011. For details on Mexican institutions see Appendix 2.

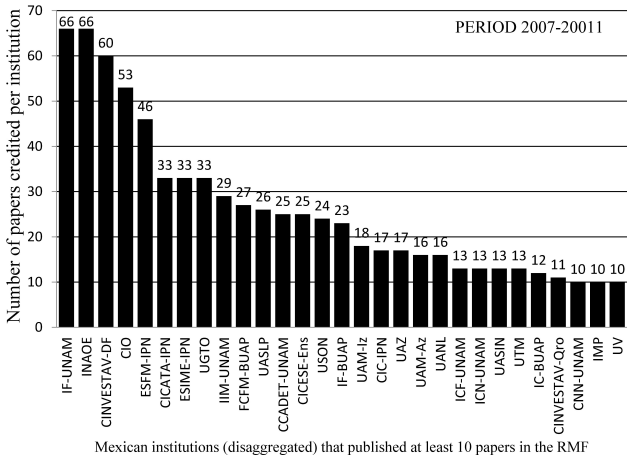

FIGURE 4. Number of papers credited per institution, with their units disaggregated, with at least ten papers published in the *Revista Mexicana de Física* over the period 2007–2011. For details on Mexican institutions see Appendix 2.

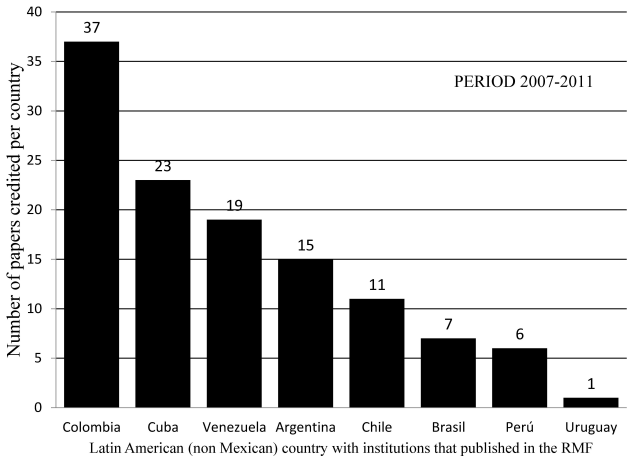

FIGURE 5. Number of papers credited per country which results from adding up those credited to their respective institutions in Latin American.

It is important to mention that, even though some of the credited papers are the result of collaboration with Mexican authors (or members of Mexican institutions), many came from papers produced solely by Latin American non Mexican authors. This is specially the case of Colombia, Cuba and Venezuela.

Finally we found a number of authors from outside Mexico and Latin America (see figure 6). In most cases these papers were collaborations with Mexican (or other Latin American) institutions. Exceptions would be Spain and China for most of their credited papers had only authors from institutions in Spain or China.

4. Concluding remarks

The extended and frequent use of the *Revista Mexicana de Física* by most Mexican (and some Latin American) institutions that do research in physics, shows the importance of our journal for the physical science community in Mexico –and to some extent, Latin America. The diverse nature of institutions, stresses the importance of keeping the *Revista Mexicana de Física* as an open and free access scientific journal, where an article is published only on its academic merits. It also accentuates the importance of our Webpage (`http://rmf.smf.mx`).

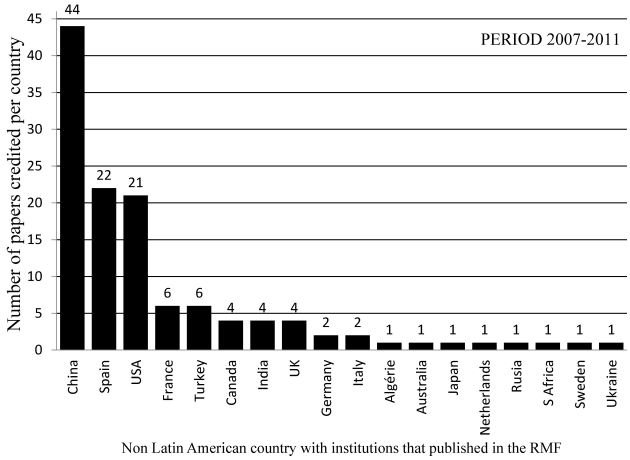

FIGURE 6. Number of papers credited per non Latin American countries. It is the result of adding up the papers credited to their respective institutions that published in the *Revista Mexicana de Física* over the period 2007–2011.

Acknowledgements

We want to thank Dra. Patricia Goldstein Menache for her critical reading of this article. We also want to acknowledge the support to the *Revista Mexicana de Física* from the following institutions: Consejo Nacional de Ciencia y Tecnología; Instituto Nacional de Astrofísica, Óptica y Electrónica; Universidad Nacional Autónoma de México through: Rectoría, Coordinación de la Investigación Científica, Instituto de Astronomía, Instituto de Ciencias Nucleares, Instituto de Investigaciones en Materiales, Instituto de Física, and Facultad de Ciencias.

Appendix 1

Applicable codes from PACS 2010

As mentioned, in order to analyze the main fields of Revista Mexicana de Fisica published papers, we used the Physics and Astronomy Classification Scheme® (PACS®), which is a hierarchical subject classification scheme, designed by the American Institute of Physics (AIP) to classify and categorize the literature of physics and astronomy.

The applicable codes from Physics and Astronomy Classification Scheme® (PACS®) are shown as they appear within the scheme's hierarchy.

00. General
    - 01. Communication, education, history, and philosophy.
    - 02. Mathematical methods in physics.
    - 03. Quantum mechanics, field theories, and special relativity.
    - 04. General relativity and gravitation.
    - 05. Statistical physics, thermodynamics, and nonlinear dynamical systems.
    - 06. Metrology, measurements, and laboratory procedures.
    - 07. Instruments, apparatus, and components common to several branches of physics and astronomy.

10. The Physics of Elementary Particles and Fields
    - 11. General theory of fields and particles.
    - 12. Specific theories and interaction models; particle systematics.
    - 13. Specific reactions and phenomenology.
    - 14. Properties of specific particles.

20. Nuclear Physics
    - 21. Nuclear structure.

23. Radioactive decay and in-beam spectroscopy.
24. Nuclear reactions: general.
25. Nuclear reactions: specific reactions.
26. Nuclear astrophysics.
27. Properties of specific nuclei listed by mass ranges.
28. Nuclear engineering and nuclear power studies.
29. Experimental methods and instrumentation for elementary-particle and nuclear physics.

30. Atomic and Molecular Physics
    31. Electronic structure of atoms and molecules: theory.
    32. Atomic properties and interactions with photons.
    33. Molecular properties and interactions with photons.
    34. Atomic and molecular collision processes and interactions.
    36. Exotic atoms and molecules; macromolecules; clusters.
    37. Mechanical control of atoms, molecules, and ions.

40. Electromagnetism, Optics, Acoustics, Heat Transfer, Classical Mechanics, and Fluid Dynamics
    41. Electromagnetism; electron and ion optics.
    42. Optics.
    43. Acoustics.
    44. Heat transfer.
    45. Classical mechanics of discrete systems.
    46. Continuum mechanics of solids.
    47. Fluid dynamics.

50. Physics of Gases, Plasmas, and Electric Discharges
    51. Physics of gases.
    52. Physics of plasmas and electric discharges.

60. Condensed Matter: Structural, Mechanical and Thermal Properties
    61. Structure of solids and liquids; crystallography.
    62. Mechanical and acoustical properties of condensed matter.
    63. Lattice dynamics.
    64. Equations of state, phase equilibria, and phase transitions.
    65. Thermal properties of condensed matter.
    66. Nonelectronic transport properties of condensed matter.
    67. Quantum fluids and solids.
    68. Surfaces and interfaces; thin films and nanosystems (structure and nonelectronic properties).

70. Condensed Matter: Electronic Structure, Electrical, Magnetic, and Optical Properties
    71. Electronic structure of bulk materials.
    72. Electronic transport in condensed matter.
    73. Electronic structure and electrical properties of surfaces, interfaces, thin films, and low-dimensional structures.
    74. Superconductivity.
    75. Magnetic properties and materials.
    76. Magnetic resonances and relaxations in condensed matter, Mössbauer effect.
    77. Dielectrics, piezoelectrics, and ferroelectrics and their properties.
    78. Optical properties, condensed-matter spectroscopy and other interactions of radiation and particles with condensed matter.
    79. Electron and ion emission by liquids and solids; impact phenomena.

80. Interdisciplinary Physics and Related Areas of Science and Technology
    81. Materials science.
    82. Physical chemistry and chemical physics.
    83. Rheology.
    84. Electronics; radiowave and microwave technology; direct energy conversion and storage.
    85. Electronic and magnetic devices; microelectronics.
    87. Biological and medical physics.
    88. Renewable energy resources and applications.
    89. Other areas of applied and interdisciplinary physics.

90. Geophysics, Astronomy, and Astrophysics
    91. Solid Earth physics.
    92. Hydrospheric and atmospheric geophysics.
    93. Geophysical observations, instrumentation, and techniques.
    94. Physics of the ionosphere and magnetosphere.
    95. Fundamental astronomy and astrophysics; instrumentation, techniques, and astronomical observations.
    96. Solar system; planetology.
    97. Stars.
    98. Stellar systems; interstellar medium; galactic and extragalactic objects and systems; the Universe.

Appendix 2

Index of Authors Institutions with Published Papers in *Revista Mexicana de Física* for the period of 2007–2011

We present a index of author(s) institutions with published papers in *Revista Mexicana de Física* throughout the period 2007–2011. Institutions are listed alphabetically according to their acronym (as defined by us, the authors of this work). Due to their geographic separation or to the magnitude (number of papers) of their contribution, in some cases we disaggregated institutions in their units and included the corresponding acronym.

BUAP: Benemérita Universidad Autónoma de Puebla.
- CIDS: Centro de Investigación en Dispositivos Semiconductores.
- FCC: Facultad de Ciencias de la Computación.
- FCE: Facultad de Ciencias de la Electrónica.

- FCFM: Facultad de Ciencias Físico Matemáticas.
- FI: Facultad de Ingeniería.
- FIQ: Facultad de Ingeniería Química.
- IF: Instituto de Física.

CENAM: Centro Nacional de Metrología, Querétaro.

CICESE: Centro de Investigación Científica y de Educación Superior de Ensenada, BC.

CICY: Centro de Investigación Científica de Yucatán A.C. Mérida, Yucatán

CIDESI: Centro de Ingeniería y Desarrollo Industrial, Querétaro.

CIGG: Centro de Investigación en Geografía y Geomática, Distrito Federal.

CIMAT: Centro de Investigación en Matemáticas. Guanajuato.

CIMAV: Centro de Investigación en Materiales Avanzados, S.C., Nuevo León y Chihuahua.

CINVESTAV: Centro de Investigación y Estudios Avanzados, IPN:

- Distrito Federal
- Guadalajara
- Mérida
- Monterey
- Querétaro.

CIO: Centro de Investigaciones en Óptica, León, Guanajuato.

CIQA: Centro de Investigación en Química Aplicada, Saltillo, Coahuila.

CNSNS: Comisión Nacional de Seguridad Nuclear y Salvaguardias, Distrito Federal.

HCSLP: Hospital Central, San Luis Potosí.

IIE: Instituto de Investigaciones Eléctricas, Cuernavaca, Morelos.

IMP: Instituto Mexicano del Petróleo, Distrito Federal.

INAOE: Instituto Nacional de Astrofísica, Óptica y Electrónica, Cholula, Puebla.

INCG: Instituto Nacional de Medicina Genómica, Distrito Federal.

IPICYT: Instituto Potosino de Investigación Científica y Tecnológica, A.C., San Luis Potosí.

INP: Instituto Nacional de Pediatría, Distrito Federal.

IPN: Instituto Politécnico Nacional.

- CIBA: Centro de Investigación en Biotecnología Aplicada, Tlaxcala.
- CIC: Centro de Investigación en Computación.
- CICATA: Centro de Investigación en Ciencia Aplicada y Tecnología Avanzada.
- ESFM: Escuela Superior de Física y Matemáticas.
- ESIA: Escuela Superior de Ingeniería y Arquitectura.
- ESIQIE: Escuela Superior de Ingeniería Química e Industrias Extractivas.
- ESIME: Escuela Superior de Ingeniería Mecánica y Eléctrica.
- ESC: Escuela Superior de Cómputo.
- UPIB: Unidad Profesional Interdisciplinaria de Biotecnología.
- UPIITA: Unidad Profesional Interdisciplinaria en Ingeniería y Tecnologías Avanzadas.

ITESM: Instituto Tecnológico y de Estudios Superiores de Monterrey:

- Campus Puebla
- Campus Estado de México
- Campus Tampico.

ITESO: Instituto Tecnológico y de Estudios Superiores de Occidente, Guadalajara

ITM: Instituto Tecnológico de Morelia

ITT: Instituto Tecnológico de Toluca

TESECA: Tecnológico de Estudios Superiores de Ecatepec

UAA: Universidad Autónoma de Aguascalientes

UABC: Universidad Autónoma de Baja California

UABJO: Universidad Autónoma "Benito Juárez" de Oaxaca

UACH: Universidad Autónoma de Chihuahua

UACJ: Universidad Autónoma de Ciudad Juárez

UACM: Universidad Autónoma de la Ciudad de México

UAEH: Universidad Autónoma del Estado de Hidalgo

UAEM: Universidad Autónoma del Estado de México

UAEMO: Universidad Autónoma del Estado de Morelos,

UAM: Universidad Autónoma Metropolitana:

- Az: Azcapotzalco
- Iz: Iztapalapa.

UANAY: Universidad Autónoma de Nayarit

UANL: Universidad Autónoma de Nuevo León

UASIN: Universidad Autónoma de Sinaloa

UASLP: Universidad Autónoma de San Luis Potosí

UAQ: Universidad Autónoma de Querétaro

UAT: Universidad Autónoma de Tlaxcala

UAY: Universidad Autónoma de Yucatán

UAZ: Universidad Autónoma de Zacatecas

UG: Universidad de Guadalajara

UGTO: Universidad de Guanajuato.

UIBERO: Universidad Iberoamericana

UJAT: Universidad Juárez Autónoma de Tabasco

ULM: Universidad de la Américas

ULSB: Universidad de La Salle Bajío

UMSNH: Universidad Michoacana de San Nicolás de Hidalgo

UNAM: Universidad Nacional Autónoma de México:

- CCA: Centro de Ciencias de la Atmósfera
- CCADET: Centro de Ciencias Aplicadas y Desarrollo Tecnológico
- CCC: Centro de Ciencias de la Complejidad, UNAM
- CCMC: Centro de Ciencias de la Materia Condensada
- CFATA: Centro de Física Aplicada y Tecnología Avanzada, Qro.
- CIE: Centro de Investigación en Energía
- CNN: Centro de Nanociencias y Nanotecnología
- FC: Facultad de Ciencias
- FES Iz: Facultad de Estudios Superiores de Iztacala

- FI: Facultad de Ingeniería
- FM: Facultad de Medicina
- FQ: Facultad de Química
- FO: Facultad de Odontología
- IA: Instituto de Astronomía
- ICF: Instituto de Ciencias Físicas
- ICML: Instituto de Ciencias del Mar y Limnología,
- ICN: Instituto de Ciencias Nucleares
- IF: Instituto de Física
- IGEOF: Instituto de Geofísica,
- II: Instituto de Ingeniería,
- IIM: Instituto de Investigaciones en Materiales
- IIMAS: Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas

UP: Universidad del Papaloapan, Oaxaca.

UPAEP: Universidad Popular Autónoma del Estado de Puebla

UPP: Universidad Politécnica de Puebla

UPSLP: Universidad Politécnica de San Luis Potosí.

UPT: Universidad Politécnica de Tulancingo, Hgo.

USON: Universidad Autónoma de Sonora

UTM: Universidad Tecnológica de la Mixteca, Oaxaca

UTP: Universidad Tecnológica de Puebla

UV: Universidad Veracruzana

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1. *Rev. Mex. Fis.* **1** (1952) 0001.
2. More details in: `http://www.aip.org/pacs/`