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Scientometric Dimensions of Neutron Scattering Research in India

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ABSTRACT

This scientometric study attempts to highlight the Neutron Scattering research in India as per the number of publications appeared in the *Scopus* database. During the period (1991-2006) a total of 1808 publications were published by the Indian scientists in the field of Neutron Scattering. The average number of publications published per year was 113. The highest number of publications (284) were published in the year 2006. Authorship and collaboration trend was towards multi-authored publications. There were 934 international collaborative publications. India had the highest number of collaborative publications (169, 18.09 per cent) with USA followed by France with 116 (12.42 per cent), Germany with 106 (11.35 per cent), and Japan with 83 (8.89 per cent) publications. The most productive Indian institutions were: Bhabha Atomic Research Centre, Mumbai with 425 publications followed by Indian Institute of Science, Bangalore with 183 publications, Saha Institute of Nuclear Physics, Kolkata with 99 publications and Tata Institute of Fundamental Research, Mumbai with 97 publications. The most preferred journals by the scientists for publication were: *Physical Review-B* with 129 publications followed by *Physical-B* with 80 publications, *Journal of Physical Chemistry-B* with 76 publications, *Pramana—Journal of Physics* with 75 publications and *Journal of Physics Condensed Matter* with 51 publications. The high frequency keywords were: neutron scattering (266), micelles (183), surface active agents (104), molecular dynamics (98), phase transitions (96), phonons (84) and small angle neutron scattering (84). The highly cited Indian publications have also been identified.

Keywords: Scientometrics, neutron scattering, neutron diffraction, India, publication productivity.

1. INTRODUCTION

The usefulness of neutron scattering as a technique to study the dynamic properties of condensed matter stems from the fact that neutrons interact with both nuclei and magnetic or unpaired electrons, and that slow neutrons have energies and wavelengths that match those of excitations and collective modes[1]. Neutron Scattering technique provide information about both dynamical and the geometrical aspects of the system under test[2]. The term "Neutron Scattering" encompasses all scientific techniques whereby the deflection of neutron radiation is used as a scientific probe. It falls into two basic categories—elastic and inelastic scattering. For several good reasons, moderated neutrons provide an ideal tool for the study of almost all forms of condensed matter. Firstly, they are readily produced at a nuclear research reactor or a spallation source. The neutrons cause pronounced interference and energy transfer effects in scattering experiments. Because the neutron is an electrically neutral particle, it is deeply penetrating, and is therefore more able to probe the bulk material. It also has the advantage that the cross sections

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for interaction do not increase with atomic number as they do with radiation from a synchrotron x-ray source. Thus neutrons can be used to analyse materials with low atomic numbers like proteins and surfactants. Neutrons may be emitted during nuclear fission (either spontaneous or triggered), nuclear fusion, very high energy reactions such as in a Spallation Neutron Source or from certain other reactions, most famously the (a, n) reaction, for example when a beryllium nucleus absorbs an alpha particle and emits a neutron. Cold, thermal and hot neutron radiation is most commonly used for scattering and diffraction experiments in order to access the properties and the structure of materials in crystallography, condensed matter physics, biology, solid-state chemistry, materials science, geology, mineralogy and related sciences. Neutron diffraction is a crystallographic method for the determination of the atomic structure of a material. One practical application of elastic neutron scattering/diffraction is that the lattice constant of metals and other crystalline materials can be very accurately measured[3].

Evaluation is a key component of any research and development activity. One well known productivity indicator is the number of publications produced by the scientists, institutions and countries. Studies like this will provide some insight into the complex dynamics of research activity and enable the scientists, policy makers and science administrators to provide adequate facilities and proper guidance in which direction the research has to be conducted. Research publications are clearly one of the quantitative measures for the basic research activity in a country. It must be added, however, that what excites the common man, as well as the scientific community, are the peaks of scientific and technological achievement, not just the statistics on publications.

There are also other kinds of research and technology development-mission oriented, industry-oriented, country-specific, etc., and progress in these cannot be obviously measured by counting only the number of publications[4]. Many scientometric studies have appeared in the literature to focus on the performance of science in various domains[5-23].

2. OBJECTIVES

The main objective of the study was to present the country-wise distribution of Neutron Scattering research. The study was also focused on the detailed analysis of Neutron Scattering research in India including the aspects like year-wise research output, subject-wise distribution, international collaboration, authorship and collaboration pattern, institution-wise publications productivity, journals preferred for publications, country-wise distribution of journals, high frequency keywords and the highly cited publications.

3. MATERIALS AND METHODS

Data was collected from the *Scopus* database (1991-2006). *Scopus* database is one of the very comprehensive databases covering all aspects of science brought out by Elsevier publishers. The search string 'Neutron Scattering* or Neutron Diffraction*' in 'All Fields' and 'India' in 'Affiliation' field of the *Scopus* database was used to retrieve the data. A total of 1,808 records were downloaded and analysed by using the spreadsheet application as per the objectives of the study. The citations received to the publications were retrieved on 31 August 2007 to identify the highly cited publications in the field.

4. RESULTS AND DISCUSSION

4.1 Country-wise Distribution of Research Output in Neutron Scattering

Figure1 provides the country-wise distribution of number of publications on Neutron Scattering. USA was the top producing country with 16,519 publications followed Germany with 10,704 publications, France with 9,560 publications, Japan with 8,155 publications, United Kingdom with 6,366 publications, Russia with 4,967 publications, Italy with 3,404 publications, Switzerland with 2,331 publications, China with 2,109 publications, Spain with 2,044 publications, Canada with 2,019 publications, India with 1,808 publications and Poland with 1803 publications.

4.2 Growth of Publications in Neutron Scattering Research in India

During 1991-2006, a total of 1,808 publications were published on Neutron Scattering by India. The average number of publications produced per year was 113. The highest number of publications 284 were produced in 2006. Figure 2 gives year-wise growth and collaboration rate on Neutron Scattering. It can be clearly visualised from the figure that growth of the literature was very low during 1991-1995 and it peaked during 1996-2006 and an exponential growth of publications was observed which indicates that research on Neutron Scattering received a major impetus during this period.

An exponential growth in number of publications was observed during 1991-2006. The highest growth rate 398.39 per cent was found during 1995-1998 with 309 publications followed by 110.37 per cent

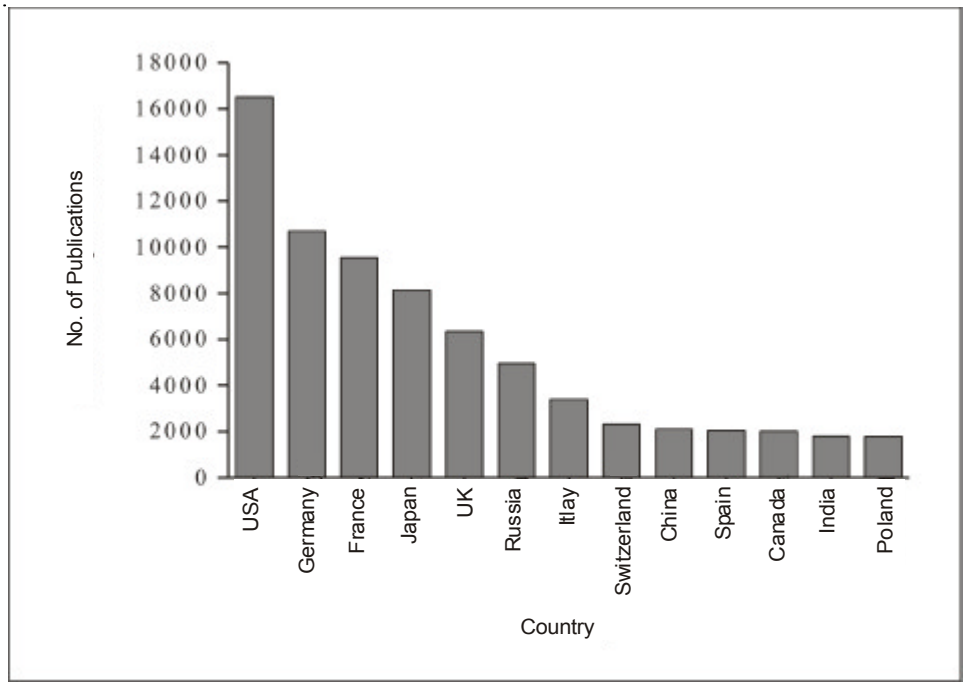

Figure 1. Country-wise distribution of number of publications on Neutron Scattering.

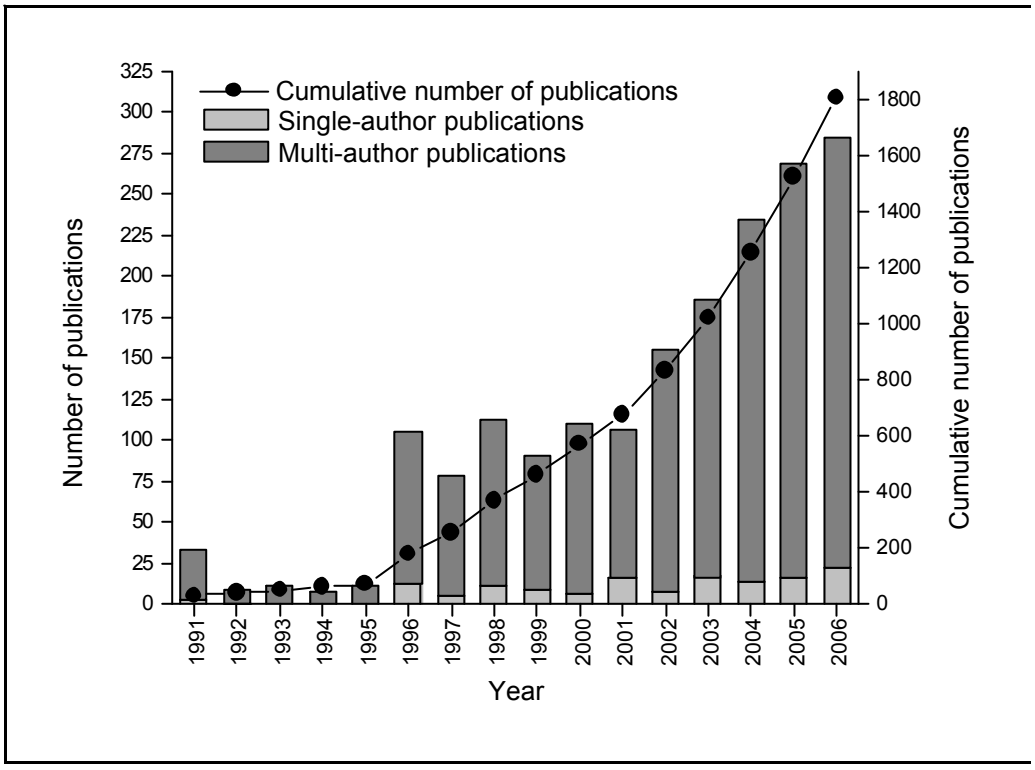

Figure 2. Year-wise publication productivity in Neutron Scattering research in India.

with 974 publications during 2003-2006 and 49.84 per cent with 463 publications during 1999-2002. Table 1 gives the growth rate of publications in Neutron Scattering research in different four year blocks.

4.3 Subject-wise Distribution of Neutron Scattering Research

On analysis of all the publications based on the subject categories as per the *Scopus* database

Table 1. Growth of publications in different four-year blocks in Neutron Scattering

Four Year Blocks	Number of Publications	Growth Rate (1991-2006)
1991-1994	62	NA
1995-1998	309	398.39
1999-2002	463	49.84
2003-2006	974	110.37

it was found that the publications were classified into 18 main subject categories. More than 38 per cent of publications were from Physics and Astronomy, followed by Chemistry (20.29 per cent), Materials Science (19.86 per cent) and Chemical Engineering (7.23 per cent). Subject-wise distribution of publications is given in Table 2. It may be noted that as the publications are multidisciplinary in nature, one publication may fall into one or more categories.

4.4 International Collaboration

India had international collaboration with 56 countries and produced 934 publications in Neutron Scattering research. India had the highest number of collaborating publications (169) with USA followed by France with 116 and Germany with 106 publications. Table 3 gives India's country-wise collaboration trend in Neutron Scattering research.

Table 3. India's country-wise collaboration trend in Neutron Scattering

Collaborating country	Number of publications	Percentage
United States	169	18.09
France	116	12.42
Germany	106	11.35
Japan	83	8.89
United Kingdom	66	7.07
Switzerland	61	6.53
Spain	42	4.50
Italy	41	4.39
Canada	35	3.75
Others countries	215	23.02
Total	934	100

Table 2. Subject-wise distribution of Neutron Scattering research

Sl. No.	Subject Category	Publications	Percentage
1	Physics and Astronomy	1,057	38.23
2	Chemistry	561	20.29
3	Materials Science	549	19.86
4	Chemical Engineering	200	7.23
5	Mathematics	75	2.71
6	Biochemistry, Genetics and Molecular Biology	72	2.60
7	Engineering	47	1.70
8	Energy	44	1.59
9	Agricultural and Biological Sciences	44	1.59
10	Multidisciplinary	37	1.34
11	Environmental Science	27	0.98
12	Earth and Planetary Sciences	25	0.90
13	Pharmacology, Toxicology and Pharmaceutics	11	0.40
14	Immunology and Microbiology	5	0.18
15	Computer Science	4	0.14
16	Medicine	4	0.14
17	Health Professions	2	0.07
18	Decision Sciences	1	0.04
	Total	2,765	100.00

4.5 Authorship and Collaboration Pattern

Authorship and collaboration trend in Neutron Scattering research is given in Fig. 3. Authorship and collaboration trend was towards multi-authored publications. There were 1,666 (92.15 per cent) multi-authored and only 142 (7.85 per cent) single-authored publications. Two-authored publications (467) accounted for 25.83 per cent, followed by three-authored publications (380) with 21.02 per cent, four-authored publications (330) with 18.25 per cent and five-authored publications (192) 10.62 per cent. There were four publications with 99 authorships each and one publication with 963 authors.

4.6 Institution-wise Distribution of Publications

There were 330 Indian institutions involved in the Neutron Scattering research. Table 4 lists the institutions that have contributed 10 or more publications during 1991-2006. The most productive Indian institutions were: Bhabha Atomic Research Centre, Mumbai with 425 publications followed by Indian Institute of Science, Bangalore with 183 publications; Saha Institute of Nuclear Physics, Kolkata with 99 publications; Tata Institute of Fundamental Research, Mumbai with 97 publications; Indian Association for the Cultivation of Science, Kolkata with 88 publications, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore with 75 publications; and Indian Institute of Technology Bombay, Mumbai with 50 publications.

4.7 Preference of Journals for Publication

The publications on Neutron Scattering research were spread over 346 journals. The leading journals preferred by the scientists were: *Physical Review-B* with 129 publications followed by *Physica-B* with 80 publications, *Journal of Physical Chemistry-B* with 76 publications, *Pramana-Journal of Physics* with 75 publications, *Journal of Physics Condensed Matter* with 51 publications, *Langmiur* with 49 publications and *Solid State Communications* with 41 publications.

Table 5 provides journal-wise scattering of publications. More than 95 per cent of the publications were published in the journals with impact factors ranging from 0.01 to 30.25. This indicates that the publication behaviour of scientists who preferred to publish their publications in high impact-factor journals. The distribution of journals as per impact factors range is given in the Fig. 4.

4.8 Country-wise Distribution of Journals

There were 346 journals spread over 20 countries. Table 6 gives country-wise distribution of journals and publications. USA has published 725 publications in 116 journals followed by England 310 publications in 71 journals, Netherlands 359 publications in 56 journals, Germany 56 publications in 29 journals, India 216 publications in 27 journals, and Switzerland 52 publications in 14 journals.

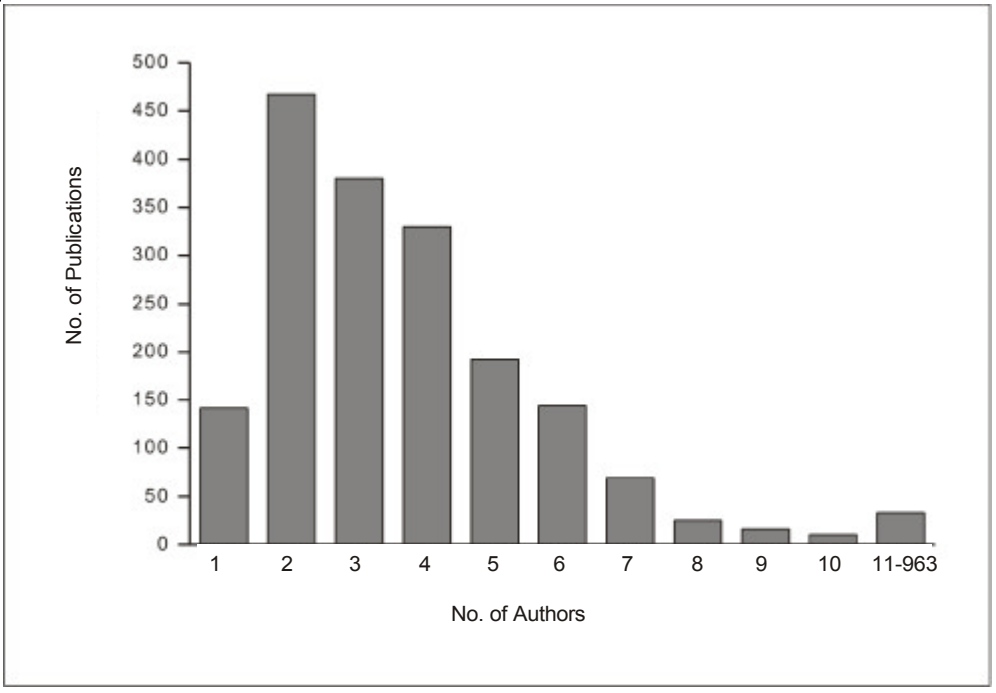

Figure 3. Authorship and collaboration trend in Neutron Scattering.

Table 4. Indian institutions with number of publications (≥ 10) on Neutron Scattering

Sl. No.	Institution	Number of Publications
1	Bhabha Atomic Research Centre, Mumbai	425
2	Indian Institute of Science, Bangalore	183
3	Saha Institute of Nuclear Physics, Kolkata	99
4	Tata Institute of Fundamental Research, Mumbai	97
5	Indian Association for the Cultivation of Science, Kolkata	88
6	Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore	75
7	Indian Institute of Technology Bombay, Mumbai	50
8	Indian Institute of Technology Kharagpur, Kharagpur	48
9	Inter University Consortium for DAE Facilities, Mumbai	47
10	Jadavpur University, Kolkata	41
11	Indian Institute of Technology Madras, Chennai	39
12	Aligarh Muslim University, Aligarh	37
13	Indian Institute of Technology Kanpur, Kanpur	36
14	Indira Gandhi Center for Atomic Research, Kalpakkam	36
15	Jawaharlal Nehru University, New Delhi	35
16	Banaras Hindu University, Varanasi	34
17	Inter University Consortium for DAE Facilities, Indore	33
18	University of Hyderabad, Hyderabad	33
19	Guru Nanak Dev University, Amritsar	28
20	Maharaja Sayajirao University of Baroda, Baroda	27
21	Devi Ahilya University, Indore	25
22	Raman Research Institute, Bangalore	24
23	National Chemical Laboratory, Pune	21
24	S.N. Bose National Centre for Basic Sciences, Kolkata	21
25	South Gujarat University, Surat	21
26	University of Delhi, Delhi	20
27	Panjab University, Chandigarh	19
28	Institute of Physics, Bhubaneswar	18
29	University of Rajasthan, Jaipur	18
30	Variable Energy Cyclotron Centre, Kolkata	16
31	Indian Institute of Technology Delhi, New Delhi	15
32	National Physical Laboratory, New Delhi	15
33	University of Pune, Pune	14
34	University of Mumbai, Mumbai	13
35	Indian Institute of Chemical Technology, Hyderabad	12
36	Institute of Mathematical Sciences, Chennai	12
37	Raja Ramanna Centre for Advanced Technology, Indore	12
38	Central Leather Research Institute, Chennai	11
39	Central Salt and Marine Chemicals Research Institute, Bhavnagar	11
40	University of Calcutta, Kolkata	11
41	Mahatma Gandhi University, Kottayam	10
42	University of Mysore, Mysore	10

Table 5. Journals with number of publications (≥ 10) on Neutron Scattering

Sl. No.	Journal	Country	IF (2005)	Number of Publications
1	*Physical Review-B: Condensed Matter and Materials Physics*	USA	3.185	129
2	*Physica-B: Condensed Matter*	Netherlands	0.796	80
3	*Journal of Physical Chemistry-B*	USA	4.03	76
4	*Pramana - Journal of Physics*	India	0.38	75
5	*Journal of Physics Condensed Matter*	England	2.145	51
6	*Langmuir*	USA	3.71	49
7	*Solid State Communications*	England	1.49	41
8	*Chemical Physics Letters*	Netherlands	2.44	38
9	*Journal of Chemical Physics*	USA	3.14	35
10	*Physical Review-C: Nuclear Physics*	USA	3.61	35
11	*Current Science*	India	0.73	34
12	*Colloids and Surfaces-A: Physicochemical and Engineering Aspects*	Netherlands	1.499	33
13	*Physical Review Letters*	USA	7.49	33
14	*Journal of Colloid and Interface Science*	USA	2.02	26
15	*Physica-C: Superconductivity and its Applications*	Netherlands	0.948	24
16	*Journal of Magnetism and Magnetic Materials*	Netherlands	0.99	23
17	*Annals of Nuclear Energy*	England	0.62	20
18	*Colloid and Polymer Science*	USA	1.26	20
19	*Nuclear Physics A*	Netherlands	1.95	20
20	*Physical Review-E: Statistical, Nonlinear, and Soft Matter Physics*	USA	2.418	20
21	*Journal of Physics-G: Nuclear and Particle Physics*	England	2.173	17
22	*Polymer*	England	2.85	17
23	*Indian Journal of Pure and Applied Physics*	India	0.495	16
24	*Applied Physics-A: Materials Science and Processing*	USA	1.99	15
25	*Bulletin of Materials Science*	India	0.78	14
26	*Journal of Physical Chemistry-A*	USA	2.9	14
27	*Journal of Surface Science and Technology*	India	NA	14
28	*Macromolecules*	USA	4.02	14
29	*Journal of Alloys and Compounds*	Switzerland	1.37	12
30	*Journal of Applied Physics*	USA	2.5	12
31	*Journal of Non-Crystalline Solids*	Netherlands	1.26	12
32	*Journal of Physics and Chemistry of Solids*	England	1.41	12
33	*Applied Surface Science*	Netherlands	1.26	11
34	*Europhysics Letters*	France	2.12	11
35	*Indian Journal of Physics*	India	NA	11
36	*International Journal of Modern Physics-B*	Singapore	0.38	11
37	*Journal of Surfactants and Detergents*	USA	0.72	11
38	*Journal of Applied Polymer Science*	USA	1.07	10
39	*Journal of the American Chemical Society*	USA	7.42	10
40	*Physical Review-E: Statistical Physics, Plasmas, Fluids, and Related Interdisciplinary Topics*	USA	2.418	10

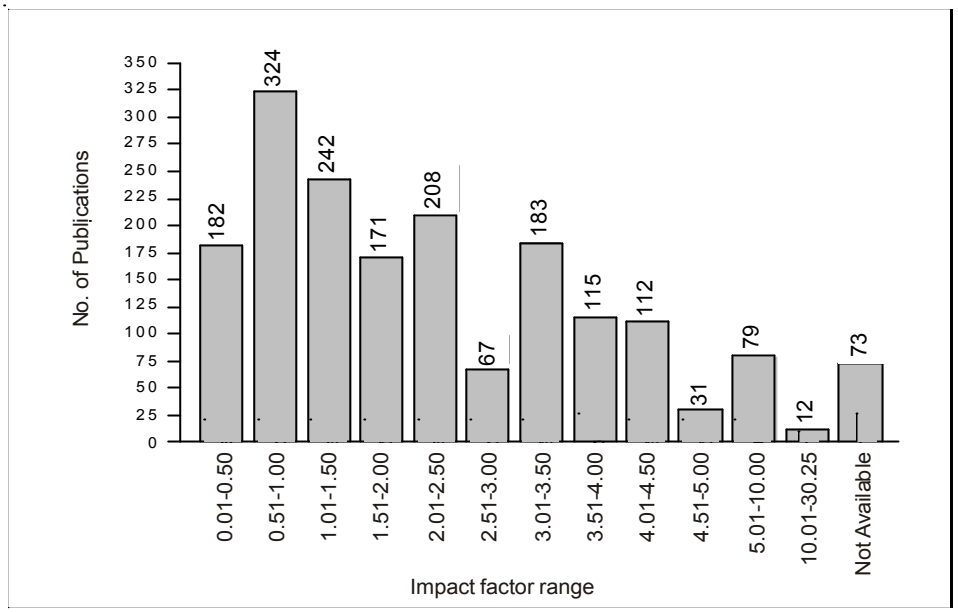

Figure 4. Impact factor range of journals and number of publications in neutron scattering.

Table 6. Country-wise distribution of journals publishing articles on Neutron Scattering

Country	Journals	Percentage	Publications	Percentage
USA	116	33.53	725	40.30
England	71	20.52	310	17.23
The Netherlands	56	16.18	359	19.96
Germany	29	8.38	56	3.11
India	27	7.80	216	12.01
Switzerland	14	4.05	52	2.89
France	7	2.02	23	1.28
Japan	7	2.02	13	0.72
Singapore	6	1.73	25	1.39
Israel	2	0.58	2	0.11
Poland	2	0.58	7	0.39
Austria	1	0.29	1	0.06
Canada	1	0.29	1	0.06
Czech-Republic	1	0.29	1	0.06
Ireland	1	0.29	1	0.06
Peoples-R-China	1	0.29	1	0.06
Slovakia	1	0.29	1	0.06
South Korea	1	0.29	3	0.17
UAE	1	0.29	1	0.06
Ukraine	1	0.29	1	0.06
Total	346	100	1799	100

4.9 Keywords Analysis

Keywords are one of the best scientometric indicators to understand and grasp instantaneously the thought content of the publications and to find out the growth of the subject field. By analyzing the keywords appeared either in the title or assigned by the indexer or the author himself help in knowing in which direction the knowledge grows. The high frequency keywords enable to understand what are all the aspects that have been studied. In the current study the keywords appeared in the 'Author Keywords' and 'Index Keywords' fields of *Scopus* database were analysed for the purpose. The high frequency keywords were: Neutron scattering (266), Micelles (183), Surface active agents (104), Molecular dynamics (98), Phase transitions (96), Phonons (84), Small angle neutron scattering (84), Mathematical models (77), Thermal effects (77), Computer simulation (60), Diffusion (58), Crystal structure (56), Solutions (56), Water (51), Fluorescence (50) and Neutron diffraction (50). Table 7 lists the high frequency keywords.

Table 7. Keywords with frequencies (≥ 20) appeared in Neutron Scattering

Keywords	Frequency	Keywords	Frequency
Neutron scattering	266	Hydrophobicity	35
Micelles	183	Raman scattering	34
Surface active agents	104	Adsorption	33
Molecular dynamics	98	Doping (additives)	33
Phase transitions	96	Single crystals	33
Phonons	84	Ions	32
Small Angle Neutron Scattering	84	Polymers	31
Mathematical models	77	Sodium compounds	31
Thermal effects	77	Superconducting transition temperature	31
Computer simulation	60	X ray scattering	31
Diffusion	58	Block copolymers	30
Crystal structure	56	High temperature superconductors	30
Solutions	56	Concentration (process)	29
Water	51	Magnetic Properties	29
Fluorescence	50	Mixed micelles	29
Neutron diffraction	50	Surface tension	29
Magnetization	48	Temperature	29
Surfactant	47	Transmission electron microscopy	29
Viscosity	47	Cationic surfactants	28
Hydrogen bonds	46	Correlation methods	28
X ray diffraction analysis	46	Micellization	28
Synthesis (chemical)	45	Approximation theory	27
X ray diffraction	45	Interfaces (materials)	27
Light scattering	44	Thermodynamic Properties	27
Neutrons	43	Thin films	27
Nanostructured materials	42	Anisotropy	26
Multilayers	41	Crystallization	26
Positive ions	41	Pressure effects	26
Agglomeration	40	Atomic force microscopy	25
Raman spectroscopy	40	Fullerenes	25
Oxide superconductors	39	Hydration	25
Molecular structure	38	Microstructure	25
Morphology	38	Phase diagrams	25
Superconductivity	38	Microemulsions	24
Electric conductivity	35	Quantum theory	24

Keywords	Frequency
Solubility	24
Thermodynamics	24
Crystal lattices	23
magnetism	23
Activation energy	22
Critical micelle concentration	22
Ferromagnetic materials	22
Lattice vibrations	22
Proteins	22
Protons	22
Solvents	22
Specific heat	22
Thermal expansion	22
Differential scanning calorimetry	21
High pressure effects	21
Perovskite	21
Salts	21
Composition	20
Composition effects	20
Glass transition	20
Phase separation	20
Phospholipids	20
Polyelectrolytes	20
Rheology	20
Transport properties	20

4.10 Highly Cited Publications

The number of citations received to the publications in Neutron Scattering research were counted as on 31 August 2007 as per *Scopus* database. There were 454 (25.11 per cent) publications which received no citations and 1,354 (74.89 per cent) publications received a total of 15,879 citations. The number of citations to the publications ranged from 0 to 893. The average number of citations received per publications was 8.78. The list of highly cited publications published by the Indian scientists is given in Table 8.

5. CONCLUSION

The paper analysed the contributions (1,808) by the Indian scientists in the field of Neutron Scattering covered in *Scopus* database during last 16 years (1991-2006). There were only 34 publications in 1991. The growth of literature was very low during 1991-1995, but thereafter, an exponential growth of publications was observed which indicates the sustained impetus received for the research during 1996-2006. The highest growth rate was observed during 1995-1998. India had highest number (169) of collaborative publications with USA. Collaboration trend was towards multi-authored publications. Bhabha Atomic Research Centre, Mumbai topped the list with 425 publications followed by Indian Institute of Science with 183 publications. More than 95 percent of the publications were published in the journals with impact factors which is suggestive of the publication behaviour of

Table 8. Highly cited publications (≥ 50) in Neutron Scattering

Sl. No.	Publication	Number of Citations
1	Agostinelli S., Allison J., Amako K., Apostolakis J., Araujo H., Arce P., Asai M., Axen D., Banerjee S., Barrand G., Behner F., Bellagamba L., Boudreau J., Broglia L., Brunengo A., Burkhardt H., Chauvie S., Chuma J., Chytracek R., Cooperman G., Cosmo G., Degtyarenko P., Dell'Acqua A., Depaola G., Dietrich D., Enami R., Feliciello A., Ferguson C., Fesefeldt H., Folger G., Foppiano F., Forti A., Garelli S., Giani S., Giannitrapani R., Gibin D., Gomez Cadenas J.J., Gonzalez I., Gracia Abril G., Greeniaus G., Greiner W., Grichine V., Grossheim A., Guatelli S., Gumplinger P., Hamatsu R., Hashimoto K., Hasui H., Heikkinen A., Howard A., Ivanchenko V., Johnson A., Jones F.W., Kallenbach J., Kanaya N., Kawabata M., Kawabata Y., Kawaguti M., Kelner S., Kent P., Kimura A., Kodama T., Kokoulin R., Kossov M., Kurashige H., Lamanna E., Lampen T., Lara V., Lefebure V., Lei F., Liendl M., Lockman W., Longo F., Magni S., Maire M., Medernach E., Minamimoto K., Mora de Freitas P., Morita Y., Murakami K., Nagamatu M., Nartallo R., Nieminen P., Nishimura T., Ohtsubo K., Okamura M., O'Neale S., Oohata Y., Paech K., Perl J., Pfeiffer A., Pia M.G., Ranjard F., Rybin A., Sadilov S., Di Salvo E., Santin G., Sasaki T., Savvas N.; GEANT4 - A simulation toolkit; *Nuclear Instruments and Methods in Physics Research, Section-A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 2003, Vol.506, Iss.3, pp.250-303	893
2	Nandi N., Bhattacharyya K., Bagchi B.; Dielectric relaxation and solvation dynamics of water in complex chemical and biological systems; *Chemical Reviews*, 2000, Vol.100, Iss.6, pp.2013-2045	261
3	Bhattacharjee P., Sigl G.; Origin and propagation of extremely high-energy cosmic rays; *Physics Reports*, 2000, Vol.327, Iss.39145, pp.109-247	253

Sl. No.	Publication	Number of Citations
4	Adams J., Adler C., Aggarwal M.M., Ahammed Z., Amonett J., Anderson B.D., Anderson M., Arkhipkin D., Averichev G.S., Badyal S.K., Balewski J., Barannikova O., Barnby L.S., Baudot J., Bekele S., Belaga V.V., Bellwied R., Berger J., Bezverkhny B.I., Bhardwaj S., Bhaskar P., Bhati A.K., Bichsel H., Billmeier A., Bland L.C., Blyth C.O., Bonner B.E., Botje M., Boucham A., Brandin A., Bravar A., Cadman R.V., Cai X.Z., Caines H., Calderon de la Barca Sanchez M., Carroll J, Castillo J., Castro M., Cebra D., Chaloupka P., Chattopadhyay S., Chen H.F., Chen Y., Chernenko S.P., Cherney M., Chikanian A., Choi B., Christie W., Coffin J.P., Cormier T.M., Cramer J.G., Crawford H.J., Das D., Das S., Derevschikov A.A., Didenko L., Dietel T., Dong X., Draper J.E., Du F., Dubey A.K., Dunin V.B., Dunlop J.C., Dutta Majumdar M.R., Eckardt V., Efimov L.G., Emelianov V., Engelage J., Eppley G., Erazmus B., Fachini P., Faine V., Faivre J., Fatemi R., Filimonov K., Filip P., Finch E., Fisyak Y., Flierl D., Foley K.J., Fu J., Gagliardi C.A., Ganti M.S., Gagunashvili N., Gans J., Gaudichet L., Germain M., Geurts F., Ghazikhanian V., Ghosh P., Gonzalez J.E., Grachov O., Grigoriev V., Gronstal S., Grosnick D., Guedon M., Guertin S.M., Gupta A., Gushin E.; Evidence from d + Au Measurements for Final-state Suppression of High-pt Hadrons in Au + Au Collisions at RHIC; *Physical Review Letters*, 2003, Vol.91, Iss.7, pp.723041-723046	246
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scientists who preferred to publish their publications in highly reputed journals. A detailed citation analysis of these publications may give interesting insights into the dynamics of this field.

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