



## CONTENT ANALYSIS OF “INDIAN JOURNAL OF PHYSICS”

Syed Ashraf Hussain<sup>1</sup> and Dr. Shashank S. Sonwane<sup>2</sup>

<sup>1</sup>MLISc M.Phil Student , Dept. of Library and Information Science , Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra State, India.

<sup>2</sup>Assistant Professor, Dept. of Library and Information Science , Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra State, India.

### ABSTRACT

**T**his paper attempts to highlights the quantitative assessment of status of the Journal by way of analyzing the various features of Journal “Indian Journal of Physics”. During 2010-2014 a total of 919 Articles were published in the Journal “Indian Journal of Physics” by researchers in various countries.

**KEYWORDS** :Authorship collaboration, international collaboration pattern, communication Channels.

### 1-INTRODUCTION

Content analysis is rapidly becoming less of a tool to be used in the experimental manipulation of the communication process. In these instances of experimental studies, systematic changes in content are made and documented through content analysis, and the audiences are observed for the effects of these changes.

The specific role to be played by content analysis in organizing for recall the world's store of recorded knowledge. Content analysis appears to have two general and major functions. The first is to provide the descriptive abstract of any document at a level and of such a nature as will indicate what information may be found in it. The second is to provide guidelines in transforming document content from one medium to another and in reducing content for ease of bibliographic access.

The “Indian Journal of Physics” is an international, peer-reviewed journal published monthly that aims to its readers with a unique forum for the exchange and sharing of information in social economics.



### 2 - OBJECTIVES OF THE STUDY

The main objective of the study is to analyze the content of Journal of “Indian Journal of Physics” and make the quantitative assessment of status of the Journal by way of analyzing the following features of Journal

- 1.To find out year-wise growth of publications,
- 2.To find out geographical distribution of research output,
- 3.To find out the authorship and collaboration pattern in the publication,
- 4.To find out the extent of international collaboration,
- 5.To find out the most productive authors in the field,
- 6.To find out organization – wise distribution of publication,
- 7.To find out the channels of communications used by the scientists and

8.To find out the high frequency keywords appeared in the channels of communication.

### 3 - SCOPE & LIMITATION OF THE STUDY

Scope of study is restricted to the "Indian Journal of Physics" published during 2010 to 2014. The papers presented in the journal are analyzed using content analysis technique.

The present study is limited to the total numbers of 919 papers published during 2010 to 2014.

### 4 - HYPOTHESIS OF THE STUDY

**The study consists of following hypothesis:**

1. Authorship trend is towards multiple authored papers.
2. India is the high productive country.
3. Majority of the affiliated Institution are from India.

### 5 - ANALYSIS OF "INDIAN JOURNAL OF PHYSICS"

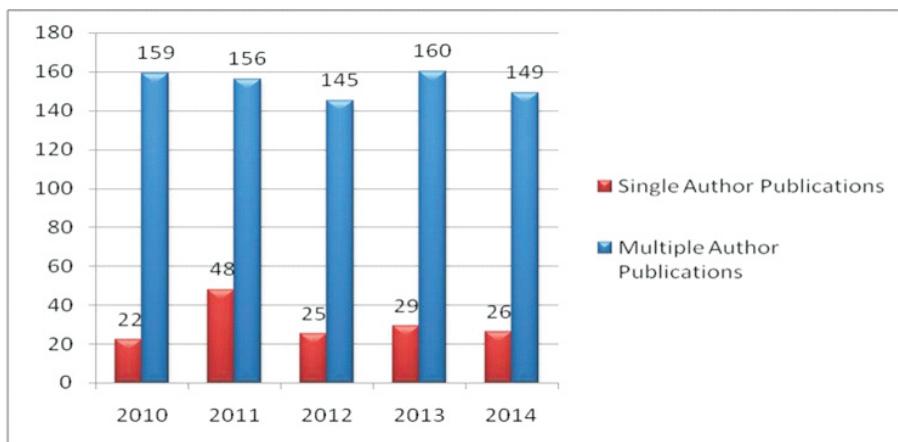
In views of the objectives of the present study, content analysis of "Indian Journal of Physics" is presented further (Indian Journal of Physics, 2014).

#### 5.1-YEAR-WISE PUBLICATION PRODUCTIVITY AND COLLABORATION RATE

The word publication means the act of publishing. Productivity refers to measures of output from production processes, per unit of input. Collaboration is a recursive process where two or more people or organizations work together toward an intersection of common goals

**Table 5.1: Year-Wise Publication Productivity and Collaboration Rate**

Year	Single Author publication	Multi author publication	Total no. of publications	Collaboration Rate
2010	22	159	181	<b>12.15</b>
2011	48	156	204	<b>23.53</b>
2012	25	145	170	<b>14.71</b>
2013	29	160	189	<b>15.34</b>
2014	26	149	175	<b>14.86</b>
<b>Total</b>	<b>150</b>	<b>769</b>	<b>919</b>	<b>16.32</b>



**Figure 5.1: Year-Wise Publication Productivity and Collaboration Rate**

It can be observed from Table No.5.1 & figure No. 5.1 that during 2010-2014 a total of 919 Articles were published in the Indian Journal of Physics by researchers in various countries.

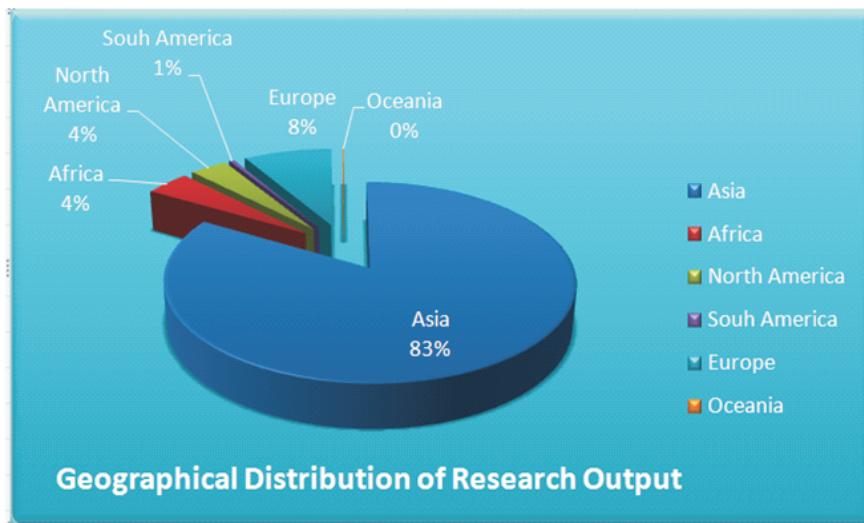
## 5.2. GEOGRAPHICAL DISTRIBUTION OF RESEARCH OUTPUT

Geographical distribution of research output means the article published from different countries. In political geography and international politics, a country is a political division of a geographical entity. Frequently, but not exclusively, a sovereign territory, the term is most commonly associated with the notions of both state and nation, and also with government.

**Table 5.2: Country-Wise Distribution of Articles**

Sr. No.	Name of the Country	Publications	Percentage
1	India	1521	54.61
2	China	313	11.24
3	Iran	186	6.68
4	Italy	74	2.66
5	USA	73	2.62
6	Egypt	69	2.48
7	Turkey	57	2.05
8	Germany	44	1.58
9	Russia	44	1.58
10	Pakistan	41	1.47
11	Saudi Arabia	34	1.22
12	Iraq	29	1.04
13	Malaysia	27	0.97
14	Korea	16	0.57
15	UK	15	0.54
16	Bangladesh	15	0.54
17	Morocco	15	0.54
18	Hungary	14	0.5
19	Romania	14	0.5
20	France	13	0.47
21	Mexico	13	0.47
22	Brazil	12	0.43
23	Canada	12	0.43
24	Switzerland	12	0.43
25	Nigeria	11	0.39
26	South Korea	11	0.39
27	Tunisia	8	0.29
28	Japan	7	0.25
29	South Africa	7	0.25
30	Spain	7	0.25
31	Poland	5	0.18
32	Portugal	5	0.18
33	Yemen	5	0.18
34	Finland	4	0.14
35	Ireland	4	0.14

36	Moldova	3	0.11
37	Nepal	3	0.11
38	Oman	3	0.11
39	Slovakia	3	0.11
40	Vietnam	3	0.11
41	Australia	2	0.07
42	Azerbaijan	2	0.07
43	Botswana	2	0.07
44	Bulgaria	2	0.07
45	Czech Republic	2	0.07
46	Denmark	2	0.07
47	Greece	2	0.07
48	Kenya	2	0.07
49	Netherlands	2	0.07
50	Palestine	2	0.07
51	Palestinian	2	0.07
52	Sweden	2	0.07
53	Armenia	1	0.04
54	Ethiopia	1	0.04
55	Serbia	1	0.04
56	Singapore	1	0.04
57	Sudan	1	0.04
58	Syria	1	0.04
59	Thailand	1	0.04
60	Ukraine	1	0.04
61	New Zealand	1	0.04
<b>Total</b>		<b>2785</b>	<b>100</b>



**Figure 5.2: Country-Wise Distribution of Articles**

It can be observed from Table No 5.2 and Figure No. 5.2 that, there were as many as 61 countries

carrying out research and produced 919 articles. Table no 5.2 provides ranked List of countries contributing to this field, the number of publications of each country and their share in percentages is the top producing country India with 1521 publications (54.61 %) of the total output. Therefore, the hypothesis, "India is the high productive country" (Hypotheses No.2) is valid. It can be stated that India being the publishing country the output is more than other country.

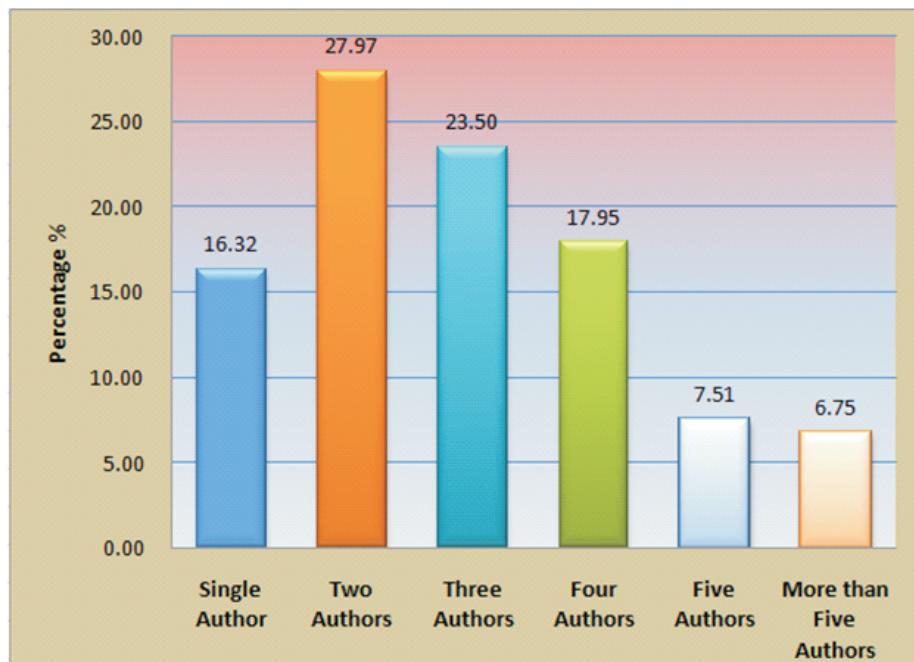
### 5.3 AUTHORSHIP AND COLLABORATION TREND:

Gupta, D.K. Authorship is an observable phenomenon reflecting the contemporary scholarly practices clearly showing the communication, productivity and collaborative patterns and influences among researchers even though their quantities and qualities are not well understood.

Collaboration in research is said to have taken place when 2 or more persons work together on a scientific problem of project and effort, both physical and intellectual.

**Table 5.3: Authorship and Collaboration Trend**

Year	Number of papers with various authorship						Total Publications
	1	2	3	4	5	More than 5	
2010	22	49	45	28	16	21	181
2011	48	46	42	31	19	18	204
2012	25	47	44	34	8	12	170
2013	29	46	53	43	12	6	189
2014	26	69	32	29	14	5	175
<b>Total</b>	<b>150</b>	<b>257</b>	<b>216</b>	<b>165</b>	<b>69</b>	<b>62</b>	<b>919</b>
<b>%</b>	<b>16.32</b>	<b>27.97</b>	<b>23.5</b>	<b>17.95</b>	<b>7.51</b>	<b>6.75</b>	<b>100</b>



**Figure No.5.3: Authorship and Collaboration Trend**

It can be observed from Table No.5.3 and Figure No.5.3 that, year-wise authorship and collaboration trend is given in table 5.3. Authorship trend is towards multiple-authored papers. Single authored papers accounted for 150 (16.32%). Therefore, the hypothesis, "Authorship trend is towards multiple authored papers. (Hypothesis No.1) is valid

#### 5.4 INTERNATIONAL COLLABORATION PATTERN OF ARTICLES

The International collaborative production of articles is the simultaneous action of many people who try to combine their ideas to make a new one. In fact "collaborative" is the process where two or more people work together toward a common goal and they don't required leadership.

**Table 5.4: International Collaboration Pattern of Articles**

Year	Single	Collaboration	Total No. of Publication
2010	166	15	181
2011	175	29	204
2012	153	17	170
2013	158	31	189
2014	157	18	175
<b>Total</b>	<b>809</b>	<b>110</b>	<b>919</b>
<b>%</b>	<b>88.03</b>	<b>11.97</b>	<b>100</b>

It can be observed from the table no. 5.4 that, out of 919 articles, 110 articles (11.97%) are written in collaboration with International Institutions. The collaboration is observed with two countries and three countries and more on.

The country which has maximum collaboration is India (1521) with (54.6%), China (313) with (11.2 %), Iran (186) with (6.7 %), Italy (74), USA (73), Egypt (69), Turkey (57), Germany and Russia (44) each, Pakistan (41), SaudiArabia (34), Iraq (29), Malaysia (27), Korea (16) UK, Bangladesh and Morocco (15) each, Hungary and Romania (14) each, France and Mexico (13) each, Brazil, Canada and Switzerland (12) each, Nigeria and South Korea (11) each, Tunisia(8), Japan, South Africa and Spain (7) each, Poland , Portugal andYemen (5) each, Finland and Ireland (4) each, Moldova, Nepal, Oman, Slovakia and Vietnam (3) each, Australia, Azerbaijan, Botswana, Bulgaria, Czech Republic, Denmark, Greece, Kenya, Netherlands, Palestine, Palestinian and Sweden (2), Armenia, Ethiopia, Serbia, Singapore, Sudan, Syria, Thailand, Ukraine and New Zealand (1) respectively.

#### 5.5 MOST PRODUCTIVE AUTHOR

An author is defined both as "the person who originates or gives existence to anything" and as "one who sets forth written statements" in the Oxford English Dictionary.

**Table No.5.5: Most Productive Author**

Sr.No.	Name of the Author	Country	No.of Publications	Rank
1	A. Kumar	India	10	1
2	S. K. Midya	India	10	1
3	S. Kumar	India	9	2
4	D. Sarkar	India	8	3
5	P. K. Jana	India	8	3
6	A. Biswas	USA	7	4
7	R. Khordad	Iran	7	4
8	S. Ghosh	India	7	4
9	A. Choudhury	India	6	5
10	A. K. Jha	India	6	5
11	A.R. El-Nabulsi	China	6	5
12	A. H. Bhrawy	Saudi Arabia	5	6
13	A. Tawfik	Egypt	5	6
14	G. C. Rout	India	5	6
15	H. Hassanabadi	Iran	5	6
16	H. R. Pakzad	Iran	5	6
17	I. Saha,	India	5	6
18	J. K. Sarma	India	5	6
19	M. A. Abdelkawy	Egypt	5	6
20	M. K. Singh	India	5	6
21	P. Chatterjee	India	5	6
22	R. K. Thapa	Nepal	5	6
23	S. Chattopadhyaya	India	5	6
24	Authors Publishing Four Paper (4x22)		88	7
25	Authors Publishing Three Paper (3x64)		192	8
26	Authors Publishing Two Paper (2x261)		261	9
27	Authors Publishing Single Paper (1x1858)		1858	10
	<b>Total</b>		<b>2804</b>	

It can be observed from Table No. 5.5 that, the most productive authors are A. Kumar and S. K. Midya (India), who had the highest number (10) of the publication each. S. Kumar (India) has 9 Publications D. Sarkar and P. K. Jana (India) with 8 Publications each. A. Biswas (USA), R. Khordad (Iran) and S. Ghosh (India) with 7 Publications each. A. Choudhury, A. K. Jha (India) and A. R. El-Nabulsi (China)

with 6 Publications each, 12 Authors with 5 publications, 22 Authors with 4 publications, 64 Authors with 3 publications, 261 Authors with 2 publications and 1858 authors with single publication.

### 5.6 INSTITUTES WISE DISTRIBUTION OF ARTICLES PUBLISHED

Institution is a society or organization for the promotion of science, education etc. An institute is a permanent organizational body created for a certain purpose. Often it is a research organization (research institution) created to do research on specific topics. An institute can also be a professional body. In some countries institutes can be part of a university or other institution of higher education either as a group of departments or an autonomous educational institution without a classic full university status such as a University Institute.

**Table 5.6: Institutes wise distribution of articles**

Sr. No	Name of the Institution	No of Publication	Rank
1	Sezione INFN, Bologna, Italy	38	1
2	Department of Physics, Gauhati University, Guwahati, 781014, India	36	2
3	Indian Centre for Space Physics, Kolkata, 700 084, India	30	3
4	Department of Physics, Aligarh Muslim University, Aligarh, 202 002, India	21	4
5	Department of Physics, Assam University, Silchar, Assam, 788 011, India	20	5
6	Teaching and Research Section of Physics, Chengdu Medical College, Chengdu, 610083, People's Republic of China	19	6
7	Department of Physics, Tezpur University, Tezpur, 784028, Assam, India	18	7
8	Department of Physics, Banaras Hindu University, Varanasi, 221 005, India	17	8
9	Department of Physics, Jadavpur University, Kolkata, 700 032, India	16	9
10	Department of Physics, Sri Venkateswara University, Tirupati, 517502, India	16	9
11	Institute for Theoretical and Experimental Physics, Moscow, Russia	16	9
12	High Energy Physics Divison, Saha Institute of Nuclear Physics, Kolkata, 700 064, West Bengal, India	15	10
13	School of Physics and Astronomy, University of Birmingham, Birmingham, UK	15	10
14	School of Biomedical Engineering, Institute of Technology, Banaras Hindu University, Varanasi, 221 005, Uttar Pradesh, India	14	11
15	School of Physical Sciences, Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, India	14	11
16	Department of Basic Sciences, Shahrood Branch, Islamic Azad University, Shahrood, Iran	13	12
17	Department of Physics, Kurukshetra University, Kurukshetra, 136119, Haryana, India	13	12
18	Institute of Physics, SachivalayaMarg, Bhubaneswar, 751005, India	13	12

19	Department of Physics, Tripura University, Suryamaninagar, 799 130, Tripura, India	12	13
20	Department of Physics, Utkal University, Bhubaneswar, 751 004, Orissa, India	12	13
21	Department of Physics, University of Kalyani, Kalyani, Nadia, 741235, West Bengal, India	11	14
22	Department of Physics, University of Lucknow, Lucknow, 226007, Uttar Pradesh, India	11	14
23	Institutions Publishing 10 Publication (10x09)	90	15
24	Institutions Publishing 9 Publication (9x13)	117	16
25	Institutions Publishing 8 Publication (8x11)	88	17
26	Institutions Publishing 7 Publication (7x10)	70	18
27	Institutions Publishing 6 Publication (6x23)	138	19
28	Institutions Publishing 5 Publication (5x32)	160	20
29	Institutions Publishing 4 Publication (4x79)	316	21
30	Institutions Publishing 3 Publication (3x109)	327	22
31	Institutions Publishing 2 Publication (2x236)	472	23
32	Institutions Publishing 1 Publication (1x634)	634	24
<b>Total</b>		<b>2802</b>	

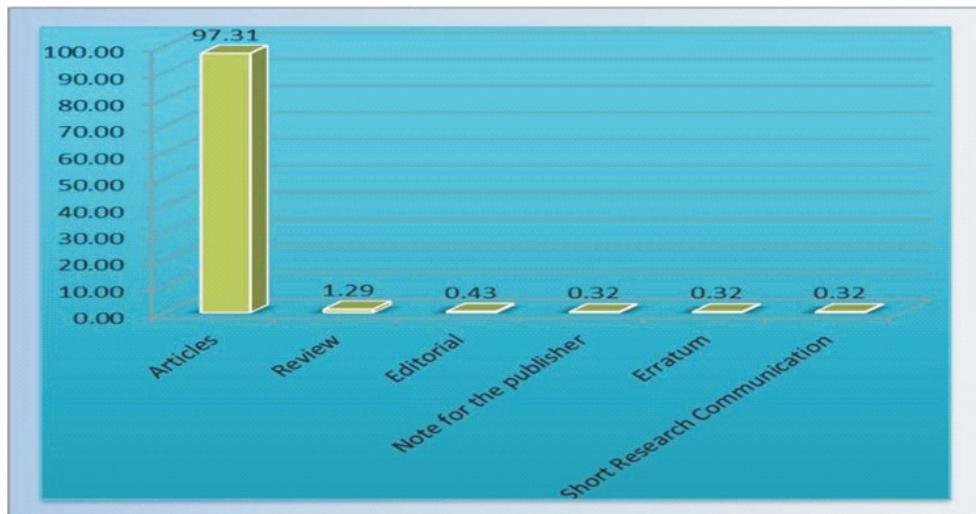
It can be observed from Table No. 5.6 that, there were 2802 organizations involved in research activity. The organizations that have contributed in the publication during 2010-2014, Sezione INFN, Bologna, Italy topped the list with 38 publication followed by Department of Physics, Gauhati University, Guwahati, 781014, India with 36 publications, Indian Centre for Space Physics, Kolkata, 700 084, India with 30 publications, Department of Physics, Aligarh Muslim University, Aligarh, 202 002, India 21 publications, Department of Physics, Assam University, Silchar, Assam, 788 011, India with 20 publications. 1 institution with 19 publications, 1 institution with 18 publications, 1 institution with 19 publications, 1 institution with 18 publications, 1 institution with 17 publications, 3 institutions with 16 publications, 2 institutions with 15 publications, 2 institutions with 14 publications, 3 institutions with 13 publications, 2 institutions with 12 publications, 2 institutions with 11 publications, 9 institutions with 10 publications, 13 institutions with 9 publications, 11 institutions with 8 publications, 10 institutions with 7 publications, 23 institutions with 6 publications, 32 institutions with 5 publications, 79 institutions with 4 publications, 109 institutions with 3 publications, 236 institutions with 2 publications and 634 institutions with Single publication. Therefore the hypothesis "Majority of the affiliated institution are from INDIA (HypothesisNo.3) is valid".

## 5.7 DISTRIBUTION OF LITERATURE IN VARIOUS CHANNELS OF COMMUNICATION

Channel, in communications, refers to the medium used to convey information from a sender (or transmitter) to a receiver. Researchers communicated their publication through variety of communication channels.

**Table 3.8: Distribution of literature in various Channels of Communication**

Sr. No.	Channel of Communication	No. of Publication	Percentage
1	Articles	906	97.31
2	Review	12	1.29
4	Editorial	4	0.43
5	Note for the publisher	3	0.32
6	Erratum	3	0.32
7	Short Research Communication	3	0.32
<b>Total</b>		<b>931</b>	<b>100</b>

**Figure No: 5.7 Distribution of literature in various Channels of Communication**

It can be observed from table no. 5.7 and Figure No.5.7 that, 97.31% of the Literature was published in Research papers followed by Review, Editorial, Note for the Publisher, Erratum, Short Research Communication. (07.69%). The total content of Indian Journal of Physics that is Editorial, Article, Book Review etc. is analyzed.

### 3.3.8 DISTRIBUTION OF KEYWORDS

"A word occurring natural language text of documents or its surrogate that is considered significant for indexing and information retrieval".(2)Keywords are the words that are used to reveal the internal structure of an author's reasoning. Keywords are one of the best scientometric indicators to understand the grasp instantaneously the thought content of the articles and to find out the growth of the subject field. By analyzing the keywords appeared either on the title or article will help in knowing in which direction the knowledge grows. "Keyword is a word that succinctly and accurately describes the subject discussed in a document".

Table No.3.9: Keywords

Sr. No	Keywords	Frequency	Rank
1	02.30.Jr	24	1
2	Quark gluon plasma	23	1
3	52.35.Sb	16	1
4	05.45.Yv	15	2
5	Optical properties	15	2
6	Jet quenching	14	3
7	X-ray diffraction	13	3
8	Density functional theory	12	4
9	XRD	12	4
10	DFT	11	5
11	Photoluminescence	11	5
12	03.65.Ge	10	6
13	52.35.Mw	10	6
14	61.05.cp	10	6
15	Heavy ion collisions	10	6
16	Thin films	10	6
17	02.30.Ik	9	7
18	05.45.Gg	9	7
19	52.35.Fp	9	7
20	78.20.Ci	9	7
21	Particle production	9	7
22	Phase transitions	9	7
23	77.22.Gm	8	8
24	78.67.Bf	8	8
25	Solitons	8	8
26	03.65.Pm	7	9
27	03.65.-w	7	9
28	Dielectric loss	7	9
29	FTIR	7	9
30	Integrability	7	9
31	Nanoparticles	7	9
32	03.65.Fd	6	10
33	05.40.-a	6	10
34	05.45.Xt	6	10
35	31.15.E-	6	10

36	68.37.Hk	6	10
37	71.15.Mb	6	10
38	77.84.-s	6	10
39	98.80.-k	6	10
40	Band gap	6	10
41	Conservation laws	6	10
42	Dielectric properties	6	10
43	IR spectra	6	10
44	Quantum plasmas	6	10
45	Solitary waves	6	10
46	<b>Key words having frequency (5 x 24)</b>	<b>120</b>	<b>11</b>
47	<b>Key words having frequency (4x 36)</b>	<b>144</b>	<b>12</b>
48	<b>Key words having frequency (3x 109)</b>	<b>327</b>	<b>13</b>
49	<b>Key words having frequency (2 x 327)</b>	<b>654</b>	<b>14</b>
50	<b>Key words having frequency (1 x 2378)</b>	<b>2378</b>	<b>15</b>
	<b>Total</b>	<b>4043</b>	

It can be observed from Table No. 3.9 that, the high frequency keywords were 02.30.Jr (24), Quark gluon plasma (23), 52.35.Sb (16), 05.45.Yv (15), Optical properties (15), Jet quenching (14) X-ray diffraction (13), Density functional theory (12), XRD (12), DFT (11), Photoluminescence(11). Table gives a list of keywords appeared in the articles.

## 6. CONCLUSION

The "Indian Journal of Physics" is an international, peer-reviewed journal published monthly that aims to its readers with a unique forum for the exchange and sharing of information in social economics.

The average numbers of articles published per year were 184. The highest numbers of Articles (204) were produced in 2011. There were as many as 61 countries carrying out research and produced 2785 articles. India is the top producing country with 1521 publications (54.61) of the total output. Authorship trend is towards multiple-authored papers. Single authored papers accounted for 4.69 %. Out of 919 articles, 110 articles (11.97%) are written in collaboration with International Institutions. The collaboration is observed with two countries and three countries. The most productive author is A. Kumar who had the highest number (10) of the publication. There were 2802 organizations involved in research activity. Researchers communicated their publication through variety of communication channels, 97.31% of the Literature was published in Research papers followed by Review, Editorial, Note for the publisher Erratum, Short Research Communicationetc. Keywords are one of the best scientometric indicators to understand the grasp instantaneously the thought content of the articles and to find out the growth of the subject field. By analyzing the keywords appeared either on the title or article will help in knowing in which direction the knowledge grows .The high frequency keywords were 02.30.Jr (24), Quark gluon plasma (23), 52.35.Sb (16), 05.45.Yv (15), Optical properties (15), Jet

quenching (14) X-ray diffraction (13), Density functional theory (12), XRD (12), DFT (11), Photoluminescence(11). Table gives a list of keywords appeared in the articles.

## 7 REFERENCES

- 1)Emory C.William, Bussiness research method, Richard D. Irwin, Illinois, 1976.
- 2)Fowler F.G. & Fowler H.W., Oxford English Dictionary, oxford university press, Londan, 1998.
- 3)Feather John & Sturges Paul, International Encyclopedia of Library and Information Science,Routledge Taylor & Francis group ,NewYork,2003
- 4)Dr. Shashank S. Sonwane and Sham B. Harne. Content Analysis of "International Journal of Social Economics". Knowledge Librarian. 2015, (Jul-Aug), 2(4): 142-160. (eISSN: 2394-2479)
- 5)Dr. Shashank S. Sonwane and Sindhu V. Navghare. Content Analysis of "International Journal of Social Economics". Knowledge Librarian. 2015, (May-June), 2(3): 96- 128. (eISSN: 2394-2479)
- 6)Pradnya K. Kivande, Dr. Shashank S. Sonwane and Dr. Govind D. Adhe. Content Analysis of International Journal of Web Information Systems. Knowledge Librarian. 2014, (Nov-Dec), 1(2): 21-40. (eISSN: 2394-2479)
- 7)<http://www.springer.com/chemistry/biotechnology/journal/11274>.
- 8) Chandrakant R. Satpute and Dr. Shashank S. Sonwane. Citation Analysis of Ph.D Theses in Electronics awarded by North Maharashtra University, Jalgaon. Knowledge Librarian. 2014, (Nov-Dec), 1(2): 61-73. (eISSN: 2394-2479)
- 9) Sanjay Sahebrao Waghmare and Dr. Shashank S. Sonwane. Content Analysis of DRTC Annual Seminar Publications (2003-2012). Knowledge Librarian. 2014, (Nov-Dec), 1(2): 74-87. (eISSN: 2394-2479)
- 10) S.L. Bhedekar and Dr. Shashank S. Sonwane. Authorship Patterns in Library and Information Science Literature in LISA (2008-2012). Knowledge Librarian. 2014, (Nov- Dec), 1(2): 140-146. (eISSN: 2394-2479)



**Syed Ashraf Hussain**

MLISc M.Phil Student , Dept. of Library and Information Science , Dr. Babasaheb Ambedkar Marathwada University Aurangabad, Maharashtra State, India.



**Dr. Shashank S. Sonwane**

<sup>2</sup>Assistant Professor, Dept. of Library and Information Science , Dr. Babasaheb Ambedkar Marathwada University , Aurangabad, Maharashtra State, India.