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**Data Collection for the Bibliometric Analysis of Astronomy and Astrophysics in India**

The database of Web of Science was used to procure the scientific papers related to Astronomy and Astrophysics (A & A). The WoS database covers three databases and over 12,000 journals that include citation references, affiliations of institutions, collaboration between countries, data on the authors etc and was the obvious source for the research . We have selected the scientific papers related to A&A that were identified among all papers indexed in WoS, to provide the essential indicators for the Bibliometric study.

**ANNEX-1**

In order to evaluate journals of quality and high performance we have made use of JCR-ESI on InCites to extract Core Journals pertaining to A & A. The journals provide metrics based on which Scientific Analysis can be carried out. These Journals make up Set1 of our Analysis and are 53 in number; producing a total of [**121,700**](http://apps.webofknowledge.com/summary.do;jsessionid=846F344CF2C61663DCEB20DA08F28312?product=WOS&doc=1&qid=2&SID=P2hse4vA1Dq6PIzN27B&search_mode=AdvancedSearch&update_back2search_link_param=yes) records of four document types (Article, Letter, Review and Proceedings Paper). These papers are collected over a period of 9 years (2006-2015). **4908** of the records was published by India. On reviewing the papers in random, we found them to be Astronomy papers

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**SET-1 :**

**# Core Astronomy and Astrology Journals**

1. ACTA ASTRONOMICA
2. ADVANCES IN ASTRONOMY
3. ADVANCES IN SPACE RESEARCH
4. ANNUAL REVIEW OF ASTRONOMY AND ASTROPHYSICS
5. ASTROBIOLOGY
6. ASTRONOMICAL JOURNAL
7. ASTRONOMISCHE NACHRICHTEN
8. ASTRONOMY & ASTROPHYSICS
9. ASTRONOMY & GEOPHYSICS
10. ASTRONOMY AND ASTROPHYSICS REVIEW
11. ASTRONOMY LETTERS-A JOURNAL OF ASTRONOMY AND SPACE ASTROPHYSICS
12. ASTRONOMY REPORTS
13. ASTROPARTICLE PHYSICS
14. ASTROPHYSICAL BULLETIN
15. ASTROPHYSICAL JOURNAL LETTERS
16. ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES
17. ASTROPHYSICAL JOURNAL
18. ASTROPHYSICS AND SPACE SCIENCE
19. ASTROPHYSICS
20. BALTIC ASTRONOMY
21. BULLETIN OF THE ASTRONOMICAL SOCIETY OF INDIA
22. CELESTIAL MECHANICS & DYNAMICAL ASTRONOMY
23. CONTRIBUTIONS OF THE ASTRONOMICAL OBSERVATORY SKALNATE PLESO
24. COSMIC RESEARCH
25. EARTH MOON AND PLANETS
26. EXPERIMENTAL ASTRONOMY
27. GEOPHYSICAL AND ASTROPHYSICAL FLUID DYNAMICS
28. GRAVITATION & COSMOLOGY
29. ICARUS
30. INTERNATIONAL JOURNAL OF ASTROBIOLOGY
31. INTERNATIONAL JOURNAL OF MODERN PHYSICS D
32. JOURNAL OF ASTROPHYSICS AND ASTRONOMY
33. JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS
34. JOURNAL OF SPACE WEATHER AND SPACE CLIMATE
35. JOURNAL OF THE KOREAN ASTRONOMICAL SOCIETY
36. KINEMATICS AND PHYSICS OF CELESTIAL BODIES
37. LIVING REVIEWS IN SOLAR PHYSICS
38. MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY
39. NEW ASTRONOMY REVIEWS
40. NEW ASTRONOMY
41. OBSERVATORY PHYSICS OF THE DARK UNIVERSE
42. PLANETARY AND SPACE SCIENCE
43. PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF AUSTRALIA
44. PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF JAPAN
45. PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF THE PACIFIC
46. RESEARCH IN ASTRONOMY AND ASTROPHYSICS
47. REVISTA MEXICANA DE ASTRONOMIA Y ASTROFISICA
48. SERBIAN ASTRONOMICAL JOURNAL
49. SOLAR PHYSICS
50. SOLAR SYSTEM RESEARCH
51. SPACE SCIENCE REVIEWS
52. SPACE WEATHER-THE INTERNATIONAL JOURNAL OF RESEARCH AND APPLICATIONS
53. ASTRONOMY AND COMPUTING

**ANNEX-2**

The second category of Journals that make up SET2 are Journals that publish papers on Astronomy and Astrophysics related fields. 15 Physics and Physics-based journals were considered. A keyword set with Astronomy related keywords was used to filter out A & A papers. On reviewing the papers in random, we found them to be mostly Astronomy related papers.“Physical Review Letters” was excluded on the fact that the output was mostly Physics dominated papers. The search restricted by the keywords, a timespan of 2006-2015 and Document type of Article, Letter, Review and Proceedings Paper resulted in [**35,231**](http://apps.webofknowledge.com/summary.do;jsessionid=846F344CF2C61663DCEB20DA08F28312?product=WOS&doc=1&qid=13&SID=P2hse4vA1Dq6PIzN27B&search_mode=AdvancedSearch&update_back2search_link_param=yes) papers of which India published **2403** papers.

**SET-2 :**

**# Journals – Physics Related**

1. EUROPEAN PHYSICAL JOURNAL C
2. LIVING REVIEWS IN RELATIVITY
3. ANNALES GEOPHYSICAE
4. ANNUAL REVIEW OF EARTH AND PLANETARY SCIENCES
5. CLASSICAL AND QUANTUM GRAVITY
6. COMPTES RENDUS PHYSIQUE
7. EUROPEAN JOURNAL OF PHYSICS
8. GENERAL RELATIVITY AND GRAVITATION
9. JOURNAL OF HIGH ENERGY PHYSICS
10. MODERN PHYSICS LETTERS A
11. NUCLEAR PHYSICS B
12. PHYSICAL REVIEW D
13. PHYSICAL REVIEW E
14. PHYSICS LETTERS B
15. RADIO SCIENCE

**#Keywords**

1. ABELL CLUSTER\*
2. ACCELERATING UNIVERSE
3. ACTIVE GALACTIC NUCLEI
4. AE STAR\*
5. ALPHA CENTAURI\*
6. AM STAR\*
7. ANTI DE SITTER\*
8. ANTI-DE SITTER\*
9. AP STAR\*
10. APOCENT\*
11. ASTERO\*
12. ASTRONOMY
13. ASTROPARTICLE PHYSIC\*
14. ASTROPHYSIC\*
15. B L LAC\*
16. BARYON ACOUSTIC OSCILLATION\*
17. BEKENSTEIN HAWKING ENTROPY\*
18. BETA PICTORIS
19. BIANCHI COSMOL\*
20. BIG BANG NUCLEOSYNTHESIS
21. BIG BANG THEORY
22. BINARY STAR\*
23. BL LAC\*
24. BLACK HOLE\*
25. BLACKHOLE\*
26. BLAZAR\*
27. BRANEWORLD COSMOLOGY
28. BRIGHT GIANT\*
29. BROWN DWARF\*
30. CARBON STAR
31. CIRCUMSTELLAR
32. CMB ANISOTROPY
33. CMB POLARIZATION
34. CMB RADIATION
35. COMET\*
36. COOL PLANET
37. COSMIC MICROWAVE BACKGROUND ANISOTROPY
38. COSMIC MICROWAVE BACKGROUND POLARIZATION
39. COSMIC MICROWAVE BACKGROUND RADIATION
40. COSMIC MICROWAVE BACKGROUND\*
41. COSMIC STRING
42. COSMIC SUPERSTRING\*
43. COSMIC WAVE\*
44. COSMOLOGICAL PERTURBATION\*
45. COSMOS
46. COSMOLOGY\*
47. DARK ENERGY
48. DARK MATTER
49. DARK UNIVERSE
50. DWARF PLANET\*
51. DWARF STAR\*
52. ECLIPES\*
53. EXOPLANET\*
54. EXOSOLAR
55. EXTRAGALA\*
56. F(R) GRAVITY
57. GALACT\*
58. GALAX\*
59. GAMMA RAY BURST\*
60. GAMMA-RAY BURST\*
61. GAS GIANT\*
62. GENERAL RELATIVITY\*
63. GIANT STAR\*
64. GLOBULAR CLUSTER
65. GRAVITATION\* WAVE\*
66. GRAVITATION\*-WAVE\*
67. GRAVITATIONAL ANOMAL\*
68. GRAVITATIONAL LENSING
69. GRAVITATIONAL PERTURBATION\*
70. GRAVITY WAVE\*
71. GRB\*
72. HERCULIS STAR\*
73. INTERSTELLAR\*
74. KUIPER BELT\*
75. LASER INTERFEROMETRIC SPACE ANTENNA
76. LOVELOCK GRAVITY
77. LOW MASS STAR
78. LOW SOLAR ACTIV\*
79. LUNAR PERTURBATION\*
80. MARS
81. MARTIAN
82. MASSIVE STAR
83. MASSIVE STAR\*
84. METEORIT\*
85. MICROWAVE ANISOTROPY PROBE
86. MILKY WAY\*
87. MURCHISON WIDEFIELD ARRAY
88. NEPTUNE
89. NEUTRINO ASTRONOMY
90. NEUTRINO DECOUPLING
91. NEUTRINO MASSES
92. NEUTRINO OSCILLATIONS
93. NEUTRINO TELESCOPES
94. NEUTRON STAR\*
95. NOVA
96. ORBITAL DECAY
97. PERSEUS\*
98. PRIMORDIAL NUCLEOSYNTHESIS
99. PROTOPLANET\*
100. PROTOSTAR
101. PROTOSTELLAR
102. PULSAR\*
103. QUANTUM COSMOLOGY
104. QUASAR
105. RADAR ASTRO\*
106. RED DWARF\*
107. REDSHIFT SURVEY
108. RINDLER COORDINATE SYSTEM
109. RINDLER FRAME
110. SATURN\*
111. SEYFERT
112. SKY SURVEY
113. SOLAR CORONA\*
114. SOLAR CYCLE
115. SOLAR FLARE\*
116. SOLAR INTERIOR
117. SOLAR JET\*
118. SOLAR PERTURBATION\*
119. SOLAR PHYS\*
120. SOLAR SYSTEM
121. SOLAR WIND
122. STAR CLUST\*
123. STAR HR-799
124. STARBURST
125. STARSPOT
126. STELLAR\*
127. SUBDWARF\*
128. SUBGIANT STAR\*
129. SUNSPOT\*
130. SUPER GIANT STAR\*
131. SUPERGIANT\*
132. SUPERNOV\*
133. TELESCOPE\*
134. TIMESPACE
135. TITAN
136. WEAK GRAVITY
137. WHITE DWARF\*
138. YELLOW DWARF\*
139. ZERO POINT LENGTH
140. CETI STAR\*
141. PERSEI STAR\*
142. VERY LARGE ARRAY
143. VLA
144. N-BODY PROBLEM
145. THREE-BODY PROBLEM
146. TWO-BODY PROBLEM
147. WORMHOLE
148. SPACETIME
149. Gravity Probe B
150. GUILFOYLE\* STAR\*

**ANNEX-3**

SET-3 consists of three high-impact Multidisciplinary Journals. To extract A & A papers, a “ NOT- Keyword exclusion” set was generated and used to eliminate those papers not related to A & A but consisted of subfields that overlapped with that of Astro.

The filters of timespan of 2006-2015, Document type of Article, Letter, Review, Proceedings Paper and the NOT-Keywords resulted in [**1,207**](http://apps.webofknowledge.com/summary.do;jsessionid=846F344CF2C61663DCEB20DA08F28312?product=WOS&doc=1&qid=29&SID=P2hse4vA1Dq6PIzN27B&search_mode=AdvancedSearch&update_back2search_link_param=yes) papers and **13** of which are from India. On reviewing the papers in random, we found them to be mostly Astronomy related papers. The handful of non- related papers were studied to see why it appeared in the list. A list of words that seemed to bring up non- relevant papers were noted and included in the “NOT- keyword exclusion” list. Many such iterations and analysis was done to refine the list of papers.

#NOT\_Keywords

1. EARTH\*
2. ECOLOG\*
3. BIOLOG\*
4. METERO\*
5. ANIMAL\*
6. COMET ASSAY\*
7. CORONARY\*
8. ASTROCYTE\*
9. STAR SHAPE\*
10. NORAL
11. STAR TOPOLOGY
12. STAR-DELTA
13. STAR CONNECTED
14. STAR NETWORK
15. GRAVITATIONAL SEARCH ALGORITHM
16. ECLIPSE IDE
17. ASTROCYTE\*
18. AURORA KINASE
19. STAR ANISE
20. STAR LIKE
21. STAR TPC
22. PLANETARY BALL MILL
23. STELLARATOR
24. STAR DETECTOR
25. STAR COLLABORATION
26. STAR EXPERIMENT
27. OSDDLINUX
28. COMPACT MUON SOLENOID
29. CMS
30. STAR POLYMER\*
31. ASTROCYTOMA\*
32. ASTROCY\*
33. MULTI-AFFINITY REMOVAL SYSTEM
34. ASTROGLIOSIS
35. ASTROGLIAL
36. SNOW LEOPARD
37. AURORA A
38. STAR SEQUENCES
39. STEROIDOGENIC ACUTE REGULATORY PROTEIN
40. ASTROVIRUS
41. SUBTYPE ANALYZER STAR
42. ZORBAX ECLIPSE
43. PROTEIN BINDING PROTEIN 2
44. SATURNIID
45. SATURNIIDAE
46. NOVAEGUINEAE
47. MULTI-AMINOACYL-TRNA SYNTHETASE
48. STAR STATUS
49. D-STAR
50. GRAPHENE
51. RISING STAR
52. GENOME
53. DNA
54. BETA STAR\*
55. PLANETARY ENERGETIC\*
56. PROTEIN CORONA\*
57. SKYRMION\*
58. PLANETARY-SCALE
59. PLANETARY SCALE
60. ANTARCTIC\*
61. SEA STAR\*
62. ASTEROIDEAN
63. CEPHEID GENEXPERT
64. CORONA VIRUS
65. AURORA B KINASE
66. AURKB
67. AURORA KINASE B
68. LEUKEMIA
69. MULTIVARIATE ADAPTIVE REGRESSION SPLINES
70. CORONA RADIATA
71. NOVARTIS
72. LESION
73. AURORA2
74. AURORA1
75. P31(COMET)
76. NETWORK COSMOL\*
77. COSMIC COLLAB\*
78. DNA
79. RNA
80. VIRUS
81. DINOSAUR\*
82. MEDICATION ADHERENCE REPORT SCALE
83. AIR POLLUTION
84. PATIENT
85. SAMSUNG GALAXY
86. CARNIVOROUS
87. SEAWATER
88. SEA WATER
89. MEGARAPTOR
90. TELESCOPING-TIME FRAME
91. ASTROGLIA
92. PROTEIN
93. BIODIVERSITY
94. CELL MIGRATION
95. CELL
96. BRAINS DARK ENERGY
97. UK COSMOS
98. STELLARIA-LONGIPES
99. GALAXIA\*
100. GALAXEA
101. NOVA SCOTIA
102. SATURNIDAE
103. EPIDEMIOLO\*
104. CORAL\*
105. CORE OUTCOME MEASURES FOR EFFECTIVENESS TRIALS
106. CLIMATE\*
107. METABOLISM
108. BRAIN NETWORK
109. CORONA RADIATION
110. TELESCOPIC BAR
111. CEPHEID XPERT"
112. "TELESCOPIC ALGORITHM
113. PUPIL DILATION
114. SUNSPOT NUMBER
115. ANTERIOR CORONA
116. COMETABOLIC\*
117. BOTAURUS-STELLARIS
118. CELESTIAL ROTATION
119. PORTABLE DOCUMENT FORMAT
120. SCYLIORHINUS STELLARIS
121. DUAL FORMAT JOURNALS
122. JUPITER FLORIDA
123. CORONA DISCHARGES
124. SEA-KEEPING TEST
125. CUNEIFORM
126. CITING BEHAVIOR
127. NEPTUNE CABLED OBSERVATORY
128. PENCILINE
129. COSMICS LEAVING OUTDOOR DROPLETS
130. CONSISTENT SALTATION
131. RAINFALL
132. MINERAL NANOPARTICLES
133. IRON OXIDE\*
134. NEPTUNE MC-ICPMS
135. KEPLERATE SOLID
136. GEOLOGICAL SURVEY
137. ASTROLOGY
138. NIKON ECLIPSE
139. EARTHQUAKE
140. TSUNAMI
141. CYCLONE
142. GANGA RIVER BASIN
143. ARYAN INVASION THEORY
144. PILLAR INSCRIPTION
145. AURORAL ELECTRON
146. GALILEO'S DISCOURSES
147. NATIONAL ELIGIBILITY TEST
148. TIME, SPACE
149. BY KEPLER
150. COSMIC EXPLOSION
151. BIBLIOMETRICS
152. FIBER OPTIC\*
153. DESERT ANT
154. CONTINENT
155. HABITABLE EARTH
156. TECTONIC\*
157. SUPERCONTINENT
158. GRAPHENE
159. GALACTO\*
160. GRB2
161. ANTICANCER
162. CANCER
163. DRUG
164. PHYTOPLANKTON
165. PLANKTON
166. ENDOCYTOSIS
167. GLOBAL WARMING
168. METHANOL
169. ORGANIC NITRATE\*
170. STRATIGRAPHY
171. SOCIAL
172. SEDIMENT
173. ENSTROPHY