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# Review Of Accelerator Science Web Based Content Project Proposal

**IUPAP-WG14 Accelerator Working Group Meeting  
11th May 2023  
Virtual**

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## Motivation

*"IUPAP-WG14 to promote the status of accelerators and large instruments of science based on particle beams to a wide audience from general public to students and policy makers."*

IUPAP Working Group on Accelerator Science (WG14) Website

## As a starting point, our review focuses on top Google search results



Internet contains many worlds in which its users' dwell and is no.1 way people find new information.



Search engines like Google are the gateway to Internet.



Knowing what the gateway to accelerator science looks like can inform decisions about its promotion.

# Questions we aim to answer

What type of content?

Who is publishing?

Who is content aimed  
at?

Where are these  
publishers?

When (where  
possible)?

What  
domains/applications  
most represented?

## Project Methods

# Project Methods

- Collect up to 100 search results (in English only) for 18 search terms to be agreed by IUPAP.
- Search results collected by computer program authored by Nkeiru Ubadike.
- Analyze and categorize the top 20 results.
- Summarize each search term.
- Compile report including methodologies.
- Provide the reports to IUPAP for further processing.



# Terms of Reference



## REVIEW OF WEB BASED ACCELERATOR SCIENCE CONTENT TERMS OF REFERENCE

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### 1. Purpose and Background

Accelerator Science is a rich and diverse field of science at the intersection of physics, engineering, material science, computing and more. Having a strong online presence is important for the Science, given that most people primarily obtain their information from the internet. This review aims to collect web-based information to provide input to the IAEA AKP development, IUPAP 14 WG and its partners outreach activities.

### 2. Audience Definition

The target audience is general. We consider content for every possible population from students to accelerator scientists and end-users.

### 3. Review Objectives

We attempt to catalogue the accelerator science content on the internet including institutional webpages and project webpages and organize them according to parameters such as date created, geographical origin, content format and application. Finally, we aim to identify any emerging trends in web-based accelerator science content and highlight a selection of the highest quality content found.

#### 2. Webpage aggregating the content found.

These deliverables will be shared with IUPAP WG14 and we also intend to use the data on the IAEA Accelerator Knowledge Portal  
<https://nucleus.iaea.org/sites/accelerators/Pages/default.aspx>.

### his Review

ser  
eutron sources)

will be used to find English language  
"accelerator technology", "synchrotrons",  
ch terms to be employed can be found in  
sd using a self written computer program  
ing Interface) and recorded in a database.  
y classifying them into various categories.

social media account, etc)  
c)

al, etc)  
; professional, general public)

illing types of web-based accelerator  
; that this review should be completed no

between IAEA and IUPAP WG14 relevant

of content including spreadsheet with all

## Search Terms to Be Used

erator

accelerator

rator

ysics

erator technology

elerator

Mass Spectrometry

ysics particle accelerator

Light Source

Laser

utron

on Capture Therapy Facility

Particle accelerator for medical purposes

Nuclear Physics accelerator

Spallation Neutron sources

- Particle accelerator
- Electrostatic accelerator
- Linear accelerator
- Accelerator physics
- Particle accelerator technology
- Ion beam accelerator
- Accelerator Mass Spectrometry
- High energy physics particle accelerator
- Synchrotron Light Source
- Free Electron Laser
- Medical Cyclotron
- Boron Neutron Capture Therapy Facility
- Particle accelerator for medical purposes
- Nuclear Physics accelerator
- Spallation Neutron sources
- Electron Beam Irradiator
- Gamma Irradiator

# Search Term Content Database and Analysis Example: "accelerator physics"



|  <b>IAEA</b><br>International Atomic Energy Agency<br><i>Atoms for Peace and Development</i> | Nkeiru UBADIKE, INTERN, PHYSICS SECTION, DIVISION OF PHYSICAL AND CHEMICAL SCIENCES, DEPARTMENT OF NUCLEAR SCIENCES AND APPLICATIONS<br>N.UBADIKE@IAEA.ORG                                                                                                                                                                                                                  |                                                                                                                                                                     | ALIZ SIMON, NUCLEAR PHYSICIST, PHYSICS SECTION, DIVISION OF PHYSICAL AND CHEMICAL SCIENCES, DEPARTMENT OF NUCLEAR SCIENCES AND APPLICATIONS ALIZ.SIMON@IAEA.ORG |                          |                                         |                    |                       |                             |              |                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------|--------------------|-----------------------|-----------------------------|--------------|------------------------------------------------------|
|                                                                                                                                                                              | REVIEW OF WEB BASED ACCELERATOR SCIENCE CONTENT : EXAMPLE SEARCH RESULT LIST FOR TERM "ACCELERATOR PHYSICS". This spreadsheet contains the top 100 results for the search term "accelerator physics". These were collected by a self written Python program. The top 20 results have been manually categorised by content format, application/domain, institution type etc. |                                                                                                                                                                     |                                                                                                                                                                 |                          |                                         |                    |                       |                             |              |                                                      |
| Title                                                                                                                                                                        | Hyperlink                                                                                                                                                                                                                                                                                                                                                                   | Snippet                                                                                                                                                             | Content Format                                                                                                                                                  | Application/Domain       | Institution Type                        | Target Audience    | Geographical location | Updated in last year (2020) | Date Created | Notes                                                |
| Accelerator physics - Wikipedia                                                                                                                                              | <a href="https://en.wikipedia.org/wiki/Accelerator_physics">https://en.wikipedia.org/wiki/Accelerator_physics</a>                                                                                                                                                                                                                                                           | Accelerator physics is a branch of applied physics, concerned with designing, building and operating particle accelerators. As such, it can be described as...      | Informational article                                                                                                                                           | General Public Education | Private Company/Institution             | Physics Student    |                       | Yes                         | 1/8/2004     |                                                      |
| Accelerator Physics   Department of Physics                                                                                                                                  | <a href="https://physics.cornell.edu/research/accelerator-physics">https://physics.cornell.edu/research/accelerator-physics</a>                                                                                                                                                                                                                                             | Accelerator Physics. Cornell accelerator physicists pursue a broad range of topics in accelerator science and technology, from the operation of the...              | Informational article                                                                                                                                           | Higher Level Education   | University                              | Physics Student    | North America         |                             |              |                                                      |
| Accelerator Physics authors/titles recent submissions                                                                                                                        | <a href="https://arxiv.org/list/physics.acc-ph/recent">https://arxiv.org/list/physics.acc-ph/recent</a>                                                                                                                                                                                                                                                                     | Accelerator Physics. Authors and titles for recent submissions. Thu, 13 Apr 2023; Wed, 12 Apr 2023; Tue, 11 Apr 2023; Mon, 10 Apr 2023; Fri, 7 Apr 2023.            | Current event article                                                                                                                                           | Physics Research         | Nonprofit or International Organization | Physics Researcher | North America         | Yes                         |              | List of recent accelerator articles published 7 days |
| Accelerator Physics (Fourth Edition)                                                                                                                                         | <a href="https://library.oapen.org/handle/20.500.12657/50490">https://library.oapen.org/handle/20.500.12657/50490</a>                                                                                                                                                                                                                                                       | It can be used as preparatory course material in graduate accelerator physics thesis research. The text covers historical accelerator development, transverse...    | Textbook                                                                                                                                                        | Higher Level Education   | Nonprofit or International Organization | Physics Student    | Europe                |                             |              |                                                      |
| Accelerator Physics   Department of Physics   The University of ...                                                                                                          | <a href="https://physics.uchicago.edu/research/accelerator-physics">https://physics.uchicago.edu/research/accelerator-physics</a>                                                                                                                                                                                                                                           | Accelerator Physics. Investigation of particle and photon beams and their mutual interactions with the goal of developing novel accelerators or radiation...        | Informational article                                                                                                                                           | Higher Level Education   | University                              | Physics Researcher | North America         |                             |              | List of recent University                            |
| Accelerator Physics                                                                                                                                                          | <a href="https://www.worldscientific.com/worldscibooks/10.1142/978-3-030-11414-1">https://www.worldscientific.com/worldscibooks/10.1142/978-3-030-11414-1</a>                                                                                                                                                                                                               | Accelerator Physics: Hamiltonian for Particle Motion in Accelerators: Linear Betatron Motion: Effect of Linear Magnetic Imperfections: Off-Momentum Orbit...        | Textbook                                                                                                                                                        | Higher Level Education   | Private Company/Institution             | Physics Student    | Asia                  | No                          |              |                                                      |
| Accelerator Physics   National Superconducting Cyclotron ...                                                                                                                 | <a href="https://nsl.msu.edu/researchers/accelerator.html">https://nsl.msu.edu/researchers/accelerator.html</a>                                                                                                                                                                                                                                                             | Accelerator Physics. Accelerators are the workhorses of nuclear physics research: the ones with the muscle to smash atoms so the aftermath can be studied.          | Informational article                                                                                                                                           | Physics Research         | Laboratory or Scientific Institute      | General Public     | North America         |                             |              | Very good the difference areas in accessible public  |
| Particle Accelerator Physics   Springerlink                                                                                                                                  | <a href="https://link.springer.com/book/10.1007/978-3-319-18314-1">https://link.springer.com/book/10.1007/978-3-319-18314-1</a>                                                                                                                                                                                                                                             | Accelerator Science and Technology: Accelerator physics textbook: Beam dynamics: Beam physics: Charged particle beams: Charged particles dynamics: Free electron... | Textbook                                                                                                                                                        | Higher Level Education   | Private Company/Institution             | Physics Student    | Europe                |                             |              |                                                      |

# Project Deliverable Example Search Term Summary for "accelerator physics"



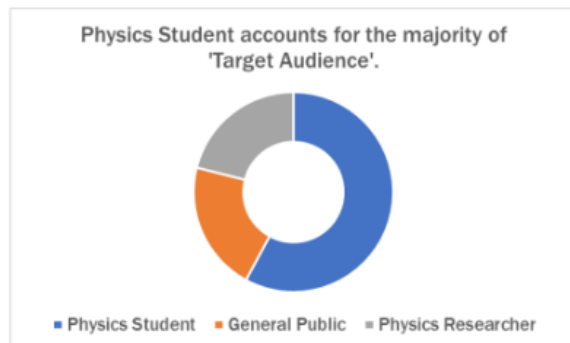
## REVIEW OF WEB BASED ACCELERATOR SCIENCE CONTENT: SAMPLE OF A SEARCH TERM RESULT SUMMARY

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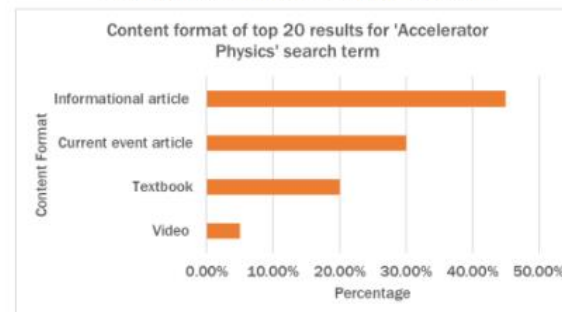
THE FOLLOWING IS AN EXAMPLE OF THE SUMMARY THAT SHALL BE WRITTEN FOR EACH SEARCH RESULT AS LISTED IN THE TERMS OF REFERENCE. THESE SUMMARY REPORTS SHALL BE PART OF A LARGER COMPREHENSIVE REPORT THAT SHALL CONTAIN A METHODOLOGY SECTION (AMONG OTHERS) WHICH WILL ADDRESS THE UNCERTAINTIES IN CLASSIFICATION AND THE JUSTIFICATIONS FOR THE CLASSIFICATIONS MADE.

The top 20 search results for the term 'accelerator physics' was largely focused on the target audience of physics students at universities.

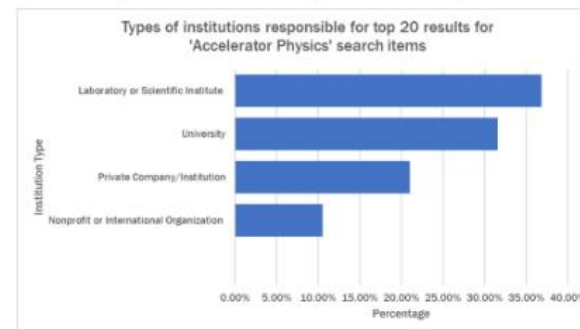


Within the content format category, informational articles were the most prevalent; two thirds of informational articles were published by universities. (Most articles gave an overview of the

particular university's accelerator physics department or research.) There was just one page which contained content in the format of video. (A news item published by a university celebrating a recent anniversary of one of their accelerator laboratories.)



Together, laboratories and universities published 68% of the top results. Most of the private companies who featured in the top results were book publishers.



North America dominated the geographical location category accounting for 71% of top results.

A web page of note was the *Accelerator Physics* page on the National Superconducting Cyclotron Laboratory site which contained short text descriptions of the various domains of accelerator physics research e.g., beam dynamics, superconducting RF etc, in language that was accessible to anyone with a secondary education in science despite the page being targeted specifically at researchers.

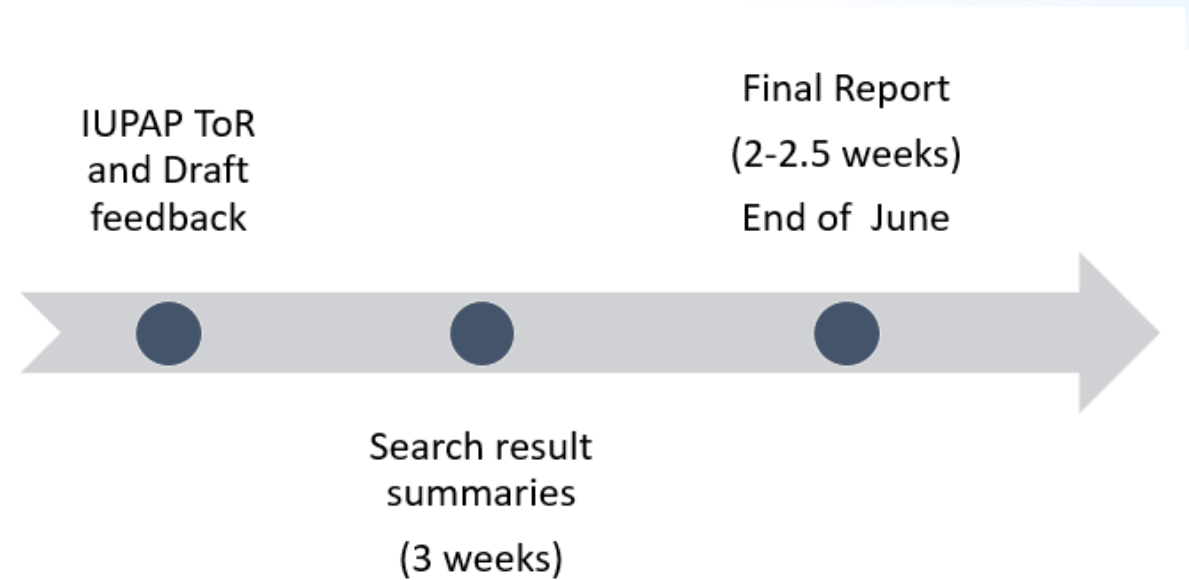
# Project Deliverables

- Report including methodologies and search term summaries
- Delivered to IUPAP



# Next Steps

- Discussions and **feedback from IUPAP** and proposed amendments to project before start
- Formal agreement on terms of reference **search terms**
- Young professionals/interns welcome to **collaborate**
- **Social media** is excluded from this review



## Take Home Messages

- Auditing Internet content can help inform decisions about promotion of accelerator science.
- An analysis of top search results of 18 accelerator science related terms taking place to gain current picture of accelerator science.
- The project culminates in a summary report .

*Thank you for your attention! We welcome  
your questions, concerns and comments!*