Open Access

from a research organization's view

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Overview

Introduction

Vision of Open Access

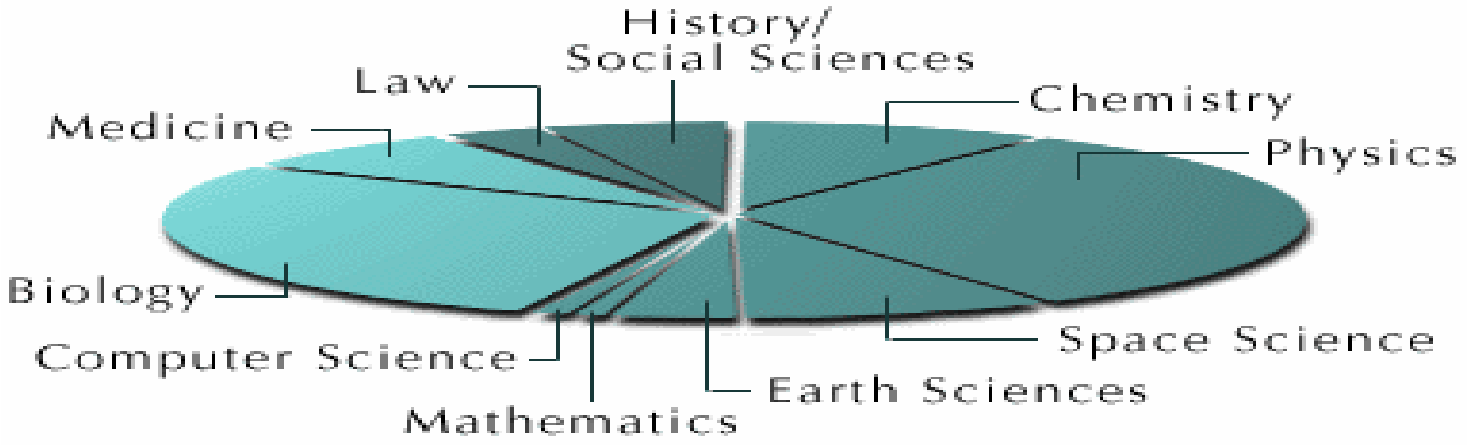
Benefits of Open Access

Current Examples

Conclusions

Max Planck Society for the Advancement of Science

- non profit research organization
- 80 Institutes (D, NL, I) dedicated to fundamental research
- 3500 researchers, ~ 12 000 incl. guests scientists & students
- multidisciplinary, wide range of research fields



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The Berlin Declaration

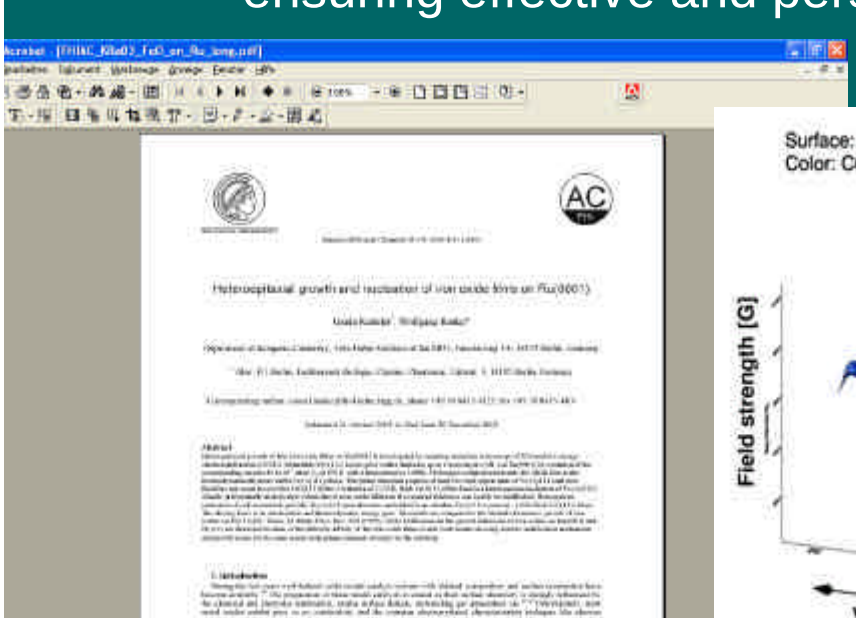
October 2003

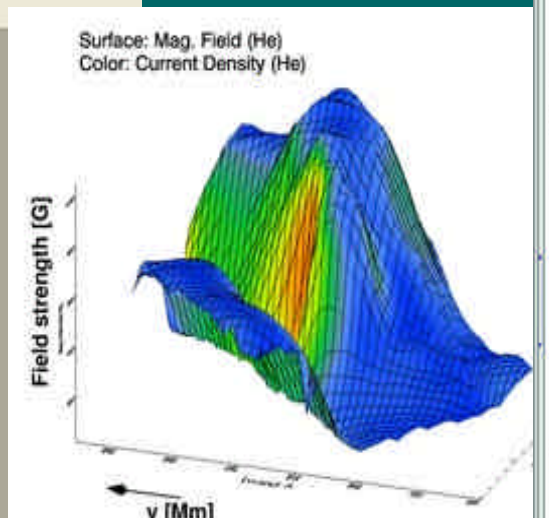
- "The Internet has fundamentally changed the practical and economic realities of distributing scientific knowledge and cultural heritage. For the first time ever, the Internet now offers the chance to constitute a global and interactive representation of human knowledge, including cultural heritage and the guarantee of worldwide access."

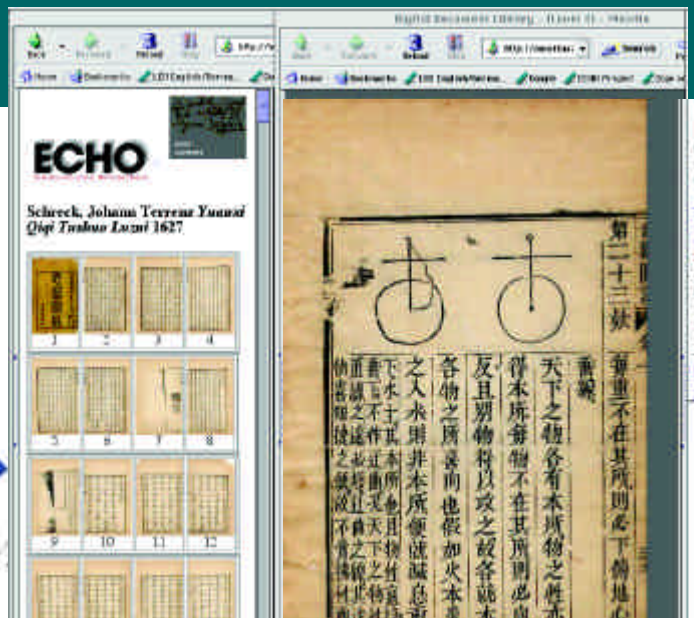
- "In order to realize the vision of a global and accessible representation of knowledge, the future Web has to be sustainable, interactive, and transparent. Content and software tools must be openly accessible and compatible."

What we mean by Open Access

- Immediate unconditional electronic access to research results: primary scientific literature (papers/books) of scholarly interest, data, (multimedia) objects representing scientific knowledge (incl. artifacts of cultural heritage)
- Standards (interfaces, formats) that support connectivity and integration in 3rd party services, discipline specific knowledge spaces etc.
- Suitable regulation of copyright/license agreement to ensure proper attribution to creator and open access dissemination - dedication to public
- No compromise on quality: transfer traditional elements, complement and improve by new approaches – transparent and community specific
- Provided through a sustainable, scalable and distributed infrastructure ensuring effective and persistent access







Open Access
Drivers of Change

1. Journal crisis and loss of access to research results
2. Requirements of research in Era of eScience
3. Enabling Technologies: Internet, Grid Technologies

Drivers of change: eScience

- Trends in research practice

  'Cyberinfrastructure', 2003 Atkins Report to NSF, http://www.communitytechnology.org/nsf_ci_report/

  – Vast improvements in raw computing power, storage capacity, algorithms, network capabilities
  – Vast improvements in measurement techniques: online digital instruments & wide-area arrays of sensors
  – Powerful data-mining techniques, operating across huge datasets

- Implications
  – New approaches to discovery
  – Global networks link all this information together
  – More interactive and broader collaboration

→ **Need dramatically new environments (e.g. collaboratories) and new capabilities of scholarly communication system**

Benefits of Open Access

quality – efficiency – acceleration - innovation

- Distributed work in Science and Humanities requires unlimited access to data and information
- Ascertained quality assessment due to immediate access to primary data interconnected with interpretation and secondary information
- Interactive scholarly communication and evaluation increase efficiency of knowledge generation
- Unrestricted access to the global knowledge base reduces opportunity costs and risk of duplication

Benefits of Open Access

quality – efficiency – acceleration - innovation

- Ensure maximal impact and use of research results, no longer discriminate use of information
- Unrestricted access fosters emerging science at the crossings of traditional disciplines.
- Data mining (unrestricted and innovative)
  - interdisciplinary relations (research)
  - accelerated networking (people, ideas, experiments)
  - seeding for technology transfer
- Unrestricted access supports dialogue between science and public/politics

Open Access increases quality and excellency of science

Open Access Benefits for Authors

- Maximized impact, higher probability of take-up
- Short term: competitive advantage by higher visibility and citation rates
- Ease of promotion of own work (immediate access by any colleague, inclusion in online cv's, combination with other research output, e.g. data, code…)

Example: Aggregation and Evaluation Living Reviews

- http://www.livingreviews.org
- LR in Gravitational Physics, LR in Solar Physics, LR in… (upcoming)
- Web based
- Published by MPG
- Since 1998
- Peer-reviewed
- Review articles
- Regularly updated
- On invitation
- International editorial board

Numerical Approaches to Spacetime Singularities - Microsoft Internet Explorer

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Popup Equation - Microsoft Internet Explorer

$$M_{BH} \approx C_F (p - p^*)^\gamma , \qquad (1)$$

(1)

C_F depends on the parameter of the initial data that is selected out. $\gamma \approx 0.37$ is the same for all choices. Furthermore, in terms of logarithmic variables T_0 is the proper time of an observer at $r = 0$, where r is the radial at which the critical evolution concludes, and κ is a constant which scales the wavelength. Koike et al. (echoes) at intervals of Δ in τ if ρ is rescaled to $\rho - \Delta$, i.e. $X(\rho - \Delta, \tau - \Delta) \approx X(\rho, \tau)$. The scaling behavior (1) demonstrates that the minimum BH mass (for bosons) is zero. The critical solution itself is a counter-example to cosmic censorship (since the formation of the zero mass BH causes high curvature regions to become visible at $r = \infty$). (See, e.g., the discussion in Hirschmann and Eardley [145].) The numerical demonstration of this feature of the critical solution was provided by Hamadé and Stewart [135]. This resu... Thorne [61, 170].

Figure 3: *This figure is the final frame of an animation of Type II critical behavior in Einstein-Yang-Mills collapse. Note the echoing in the near-critical solution. For the entire movie and related references see [77].*

Soon after this discovery, scaling and critical phenomena were found in a variety of contexts. Abrahams and Evans [1] discovered the same phenomenon in axisymmetric gravitational wave collapse with a different value of Δ and, to within numerical error, the same value of γ. (Note that the rescaling of r with $e^\Delta \approx 30$ required Choptuik to use adaptive mesh refinement (AMR) to distinguish subsequent echoes. Abrahams and Evans' smaller Δ ($e^\Delta \approx 1.8$) allowed them to see echoing with their 2+1 code without AMR.) Garfinkle [109] confirmed Choptuik's results with a completely different algorithm that does not require

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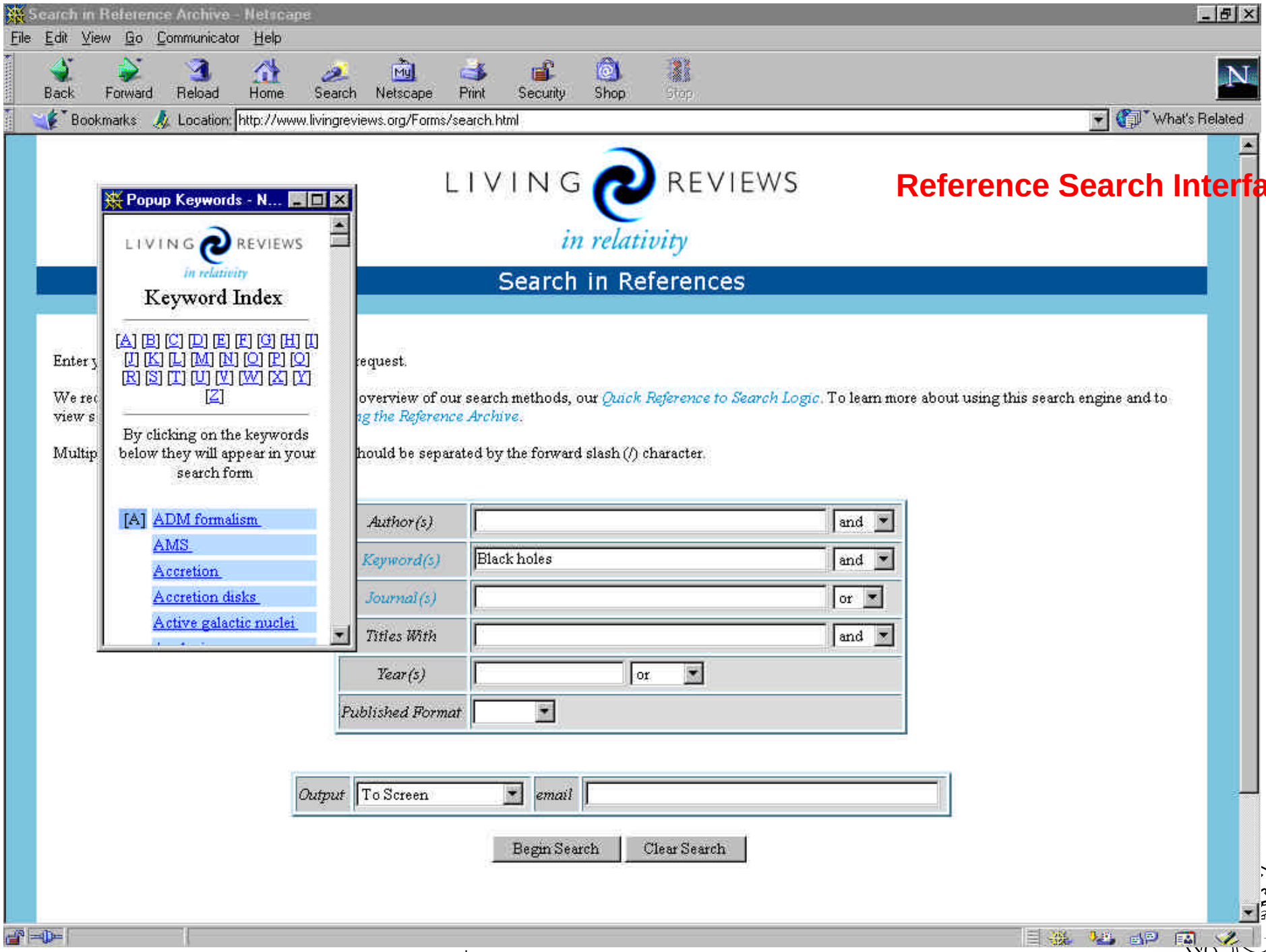
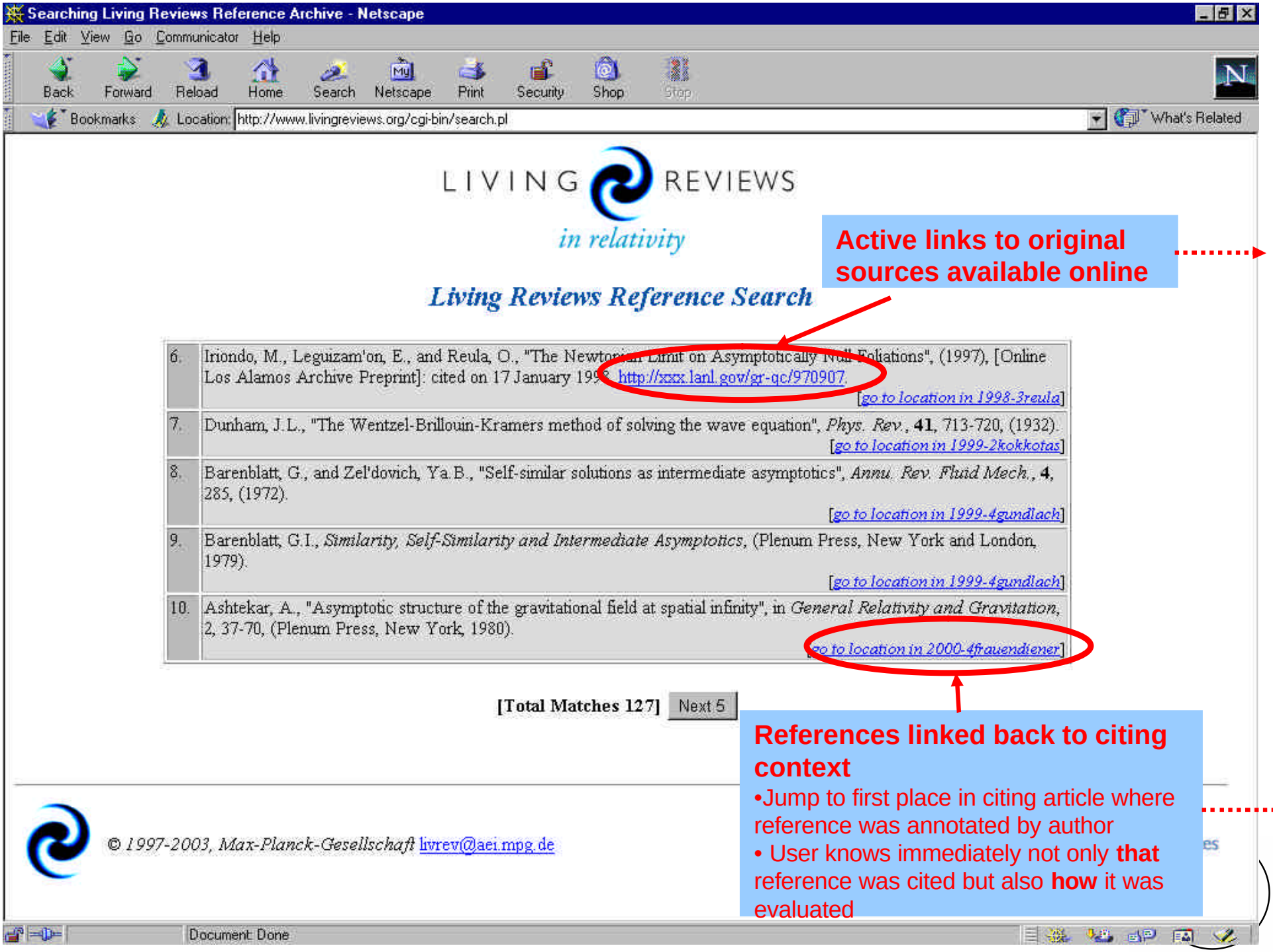
Internet

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Example: Aggregation and Evaluation Living Reviews

Role in an Open Access World:

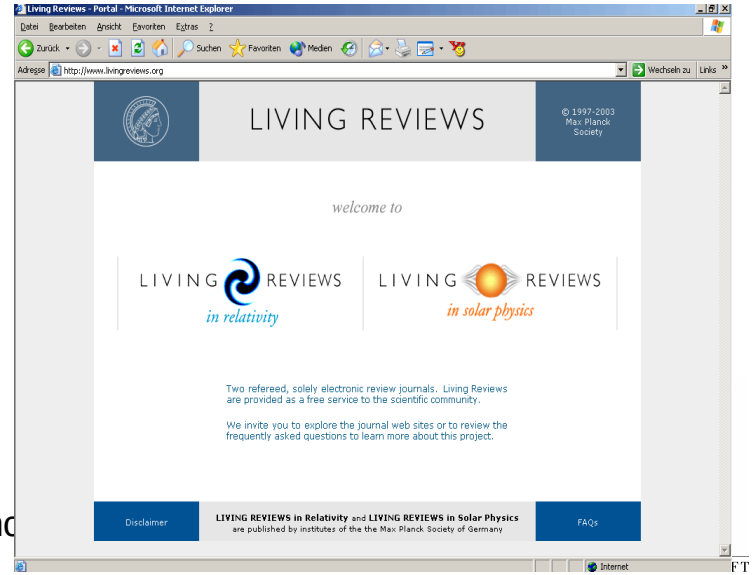
- Immediate access to most relevant literature and online resources
  - Orientation
  - provision of context and evaluation
- Part of Global Mathematics and Physics Library:

  Ongoing Work (funded by EC): Semantic Math Mark-Up

  → Searching of mathematical expressions

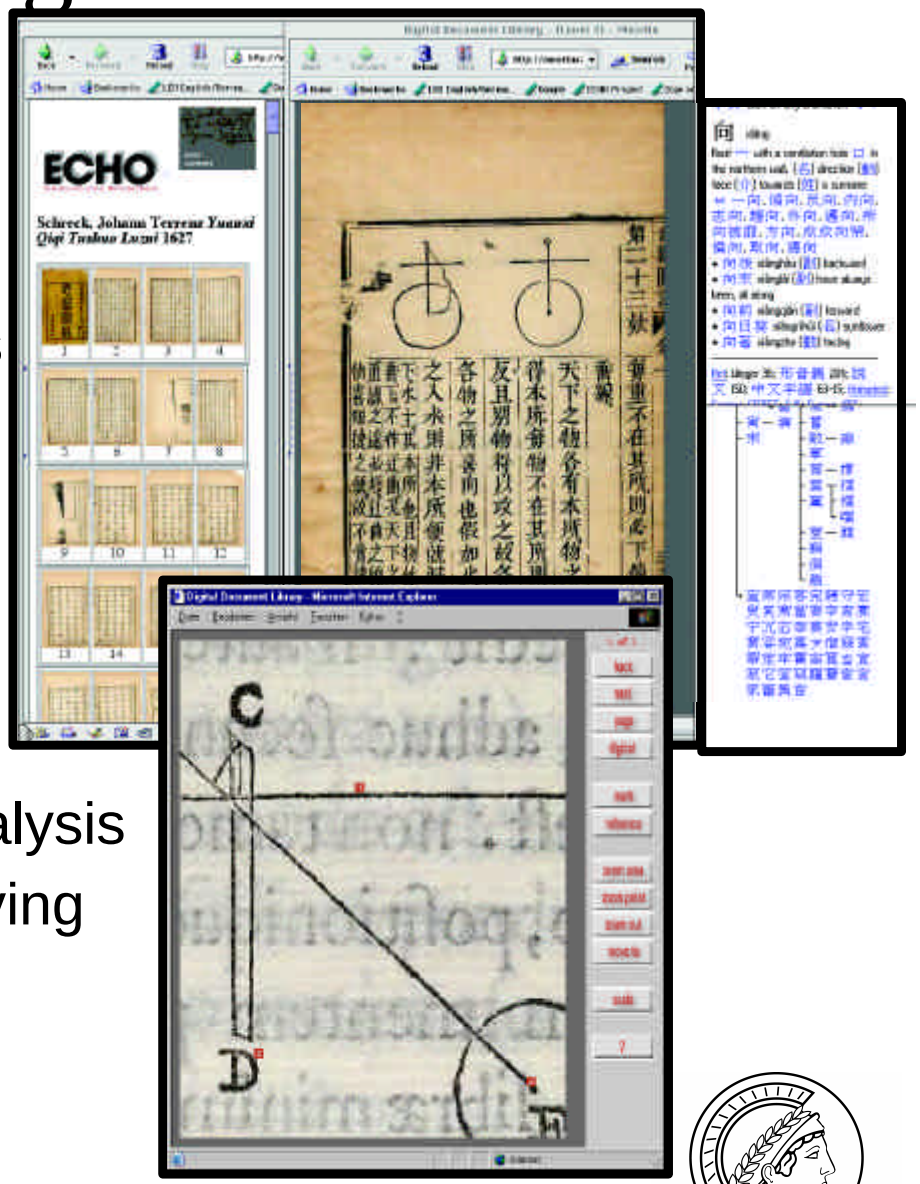
  → Navigation by mathematical concepts

  → Building of global open mathematics library



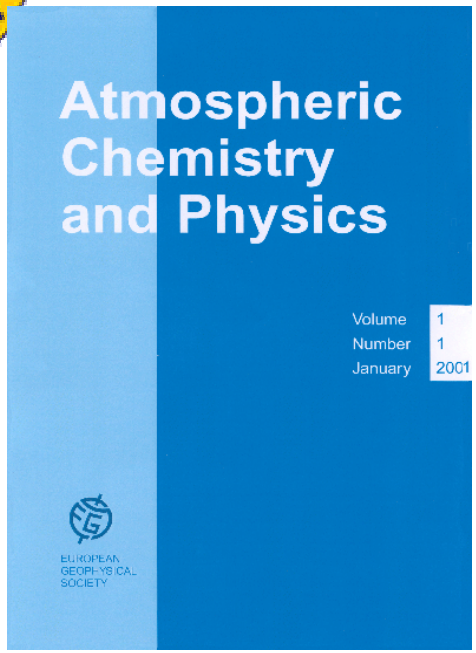
Example: Knowledge Weaving European Cultural Heritage Online

- http://echo.mpiwg-berlin.mpg.de
- collection of sources ranging from cuneiform libraries, via archeological and anthropological sources, sources of the history of science, to video documentations of human behavior.
- Goal: bring together distributed collections, support interactive study
- Share tools to support interpretation of images, annotations, language analysis
- Vision: collaborative knowledge weaving
  - semantic links



Example: Quality Assurance
Journal for Atmospheric Chemistry and Physics

- www.atmos-chem-phys.org
- Quality assurance by interactive peer-review and public discussion
- Started 2001
- Publisher & Distribution
  - *European Geosciences Union (EGU)*
  - ***free internet access***
- Motivation:
  - `Large fraction of scientific publications careless, useless, or false
  - Traditional journals & peer review fail to provide efficient scientific exchange & quality assurance



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Dilemma

by Ullrich Poeschl, Oct 2003

Two conflicting needs of scientific publishing:

rapid publication vs. thorough review & discussion

Rapid Publication: **widely pursued**

- *required for efficient exchange of new findings & open questions*
- *traditional journals push for short peer review times (2-4 weeks) & prefer short papers with little detailed information*
- *preprints & proceedings with no or little quality assurance flood the information market*

Thorough Review & Discussion: **widely neglected**

- *required to identify scientific flaws, useless research & duplications*
- *rarely possible by a couple of referees within 2-4 weeks*
- *frequently ignored for spectacular high-impact publications*
- *uncritical trust of publications in journals with high statistical impact factors*

Solution

Two-stage publication process with interactive peer review & public discussion

Rapid publication of Discussion Paper

pre-selected by editors (referees), fully citable & permanently archived (more than traditional preprint)

Interactive Peer Review & Public Discussion

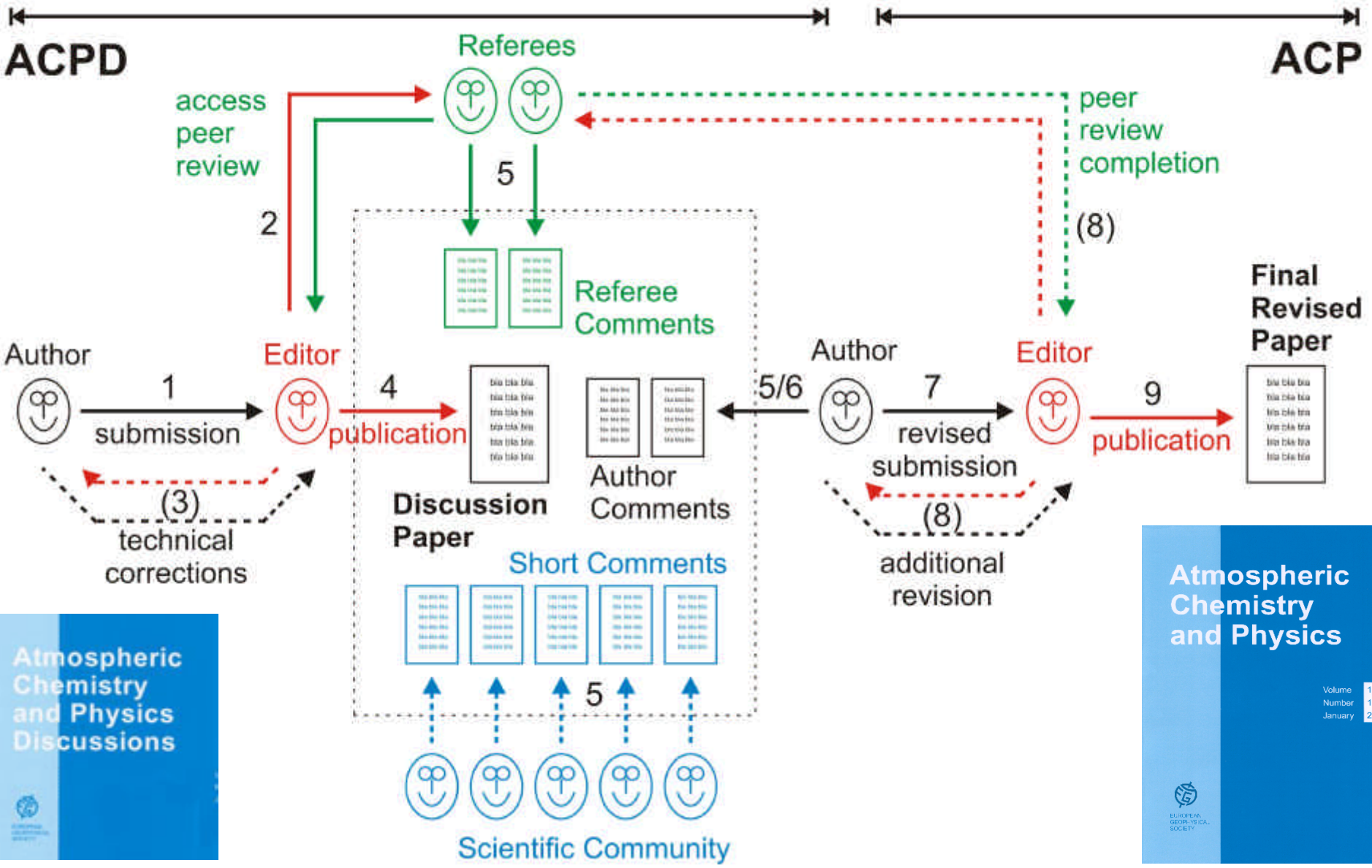
referee comments & additional comments by interested colleagues published alongside the discussion paper (anonymous or attributed, non-reviewed but individually citable & permanently archived)

Thorough review completion & publication of Final Revised Paper

analogous to traditional peer review & journal publication

Interactive Journal Concept

Discussion Forum *(pub. stage1)* + Journal *(pub. stage 2)*



Primary Effects & Advantages

All-win situation for authors, referees & readers

Discussion Paper

- *free speech & rapid publication (authors & readers)*

Interactive Peer Review & Public Discussion

- *direct feedback & public recognition for high quality papers (authors)*
- *prevention of hidden obstruction & plagiarism (authors)*
- *documentation of critical comments, controversial arguments, scientific flaws & complementary information (referees & readers)*
- *deterrence of careless, useless & false papers (referees & readers)*

Final Revised Paper

- ***maximum quality assurance & information density***
  through complete peer review, public discussion & final revision ***(readers)***

Conclusions

- Internet provides opportunity to create a global and interactive representation of human knowledge
- Open access increases quality and excellence of research
- Full potential of eScience for scholarly communication can only be unlocked if public information is made openly accessible

Thank you for your attention.

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