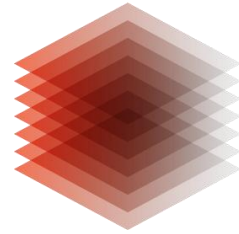

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TIB

Make the most of your visual simulation data

Bastian Drees and Thomas Koprucki
Copenhagen, 27 July 2017
NUSOD 2017

Agenda

- 1. TIB and AV-Portal**
- 2. Visual Simulation Data**
- 3. Make the most of it!**
 - i. Citation, DOI and MFID**
 - ii. Increasing Visibility**

Technische Informationsbibliothek (TIB)

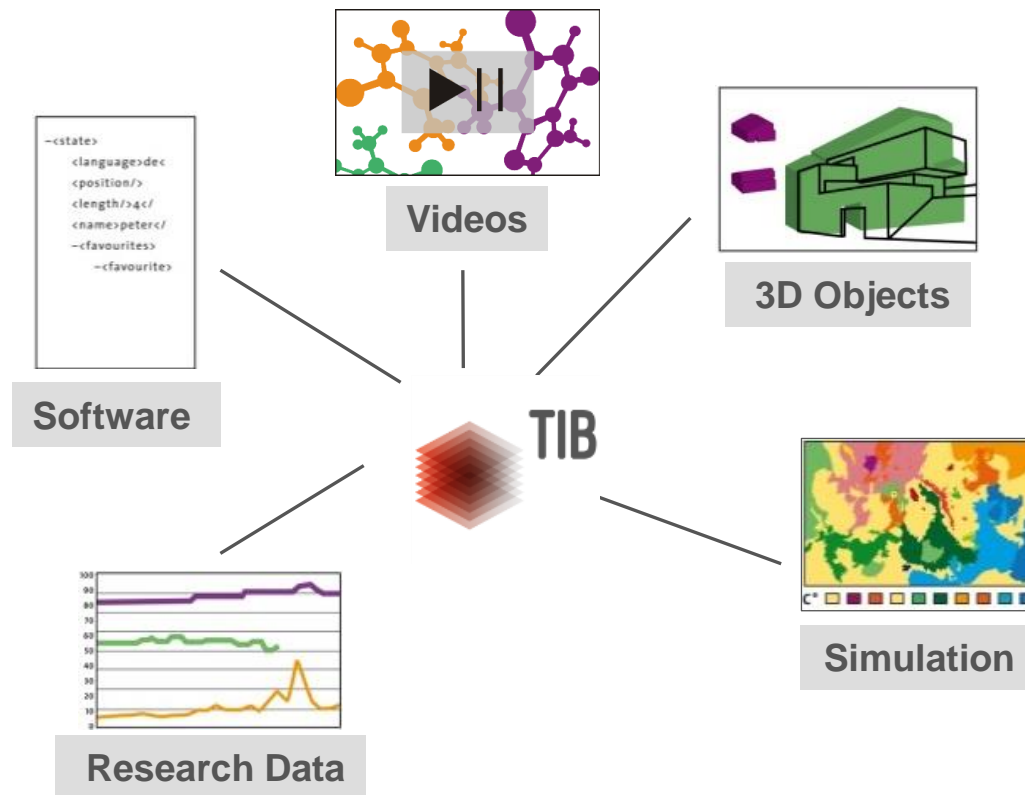


- The Leibniz Information Centre for Science and Technology and University Library
- The German National Library for Science and Technology
- World's largest library for science and technology
- Financed by German Federal Government and all Federal States
- An infrastructure provider for **the whole scientific work process**

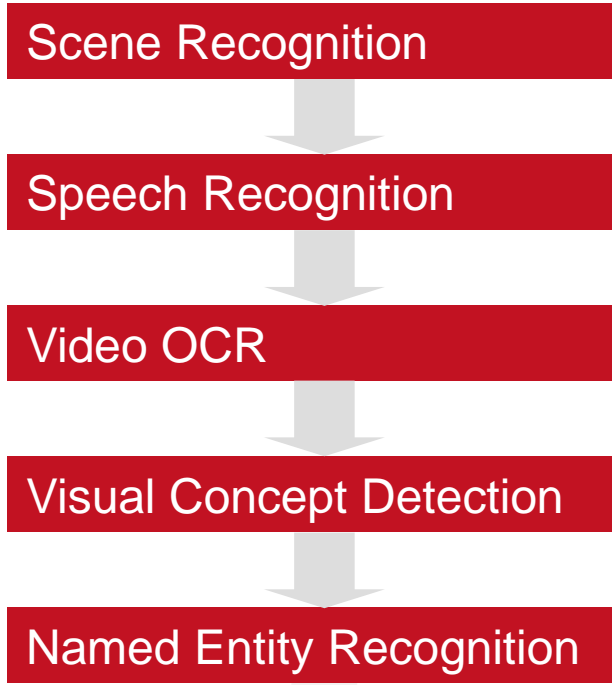


TIB-Strategy: Move beyond text

- Competence Centre for Non-Textual Materials



TIB AV-Portal



The screenshot shows the TIB AV-Portal interface. At the top left is the TIB AV-PORTAL logo. A search bar contains the text "nanostructure" and a "Search" button. Below the search bar is a video player showing a lecture by Prof. Dr. Lorke, Axel, titled "Die ganz kleine Form". The video content includes diagrams of quantum mechanical properties of nanostructures. To the right of the video player is the "Automated Media Analysis" section, which is currently in "Recognized Entities" mode. It features a search bar and several filter buttons for "Speech", "Text in the video", and "Image content". Below these are numerous tags representing recognized entities, such as "Halyard", "Sunlight", "Device driver", "Energy level", "Fence", "Ground state", "Computer animation", "Direction (geometry)", "Hochmagnetfeld", "Atom", "Berge <Bergbau>", "Energie", "Nanotechnology", "Auge <Meteorologie>", "Quantum state", "Buchherstellung", "Coachwork", "Electronics technician", "Bookbinding", "Optical fiber", "Energie", "Absorbance", "Leadlight", "Year", "Aerodynamics", "Dimension stone", "Glass", "Electronic stability control", "Wave function", "Former", "Atomic orbital", "Glasfaserkabel", "Density of states", "Lücken <Gleichstrom>", "Nanoparticle", "Nanostruktur", "Magnetism", and "Information and communications technology". The "Nanostruktur" tag is highlighted in red. Below the video player, there is a "Citation of segment" field with the URL "https://doi.org/10.5446/21538#t-18:48,24:31", an "Embed Code" field with an HTML embed code, and a "Download video" button.

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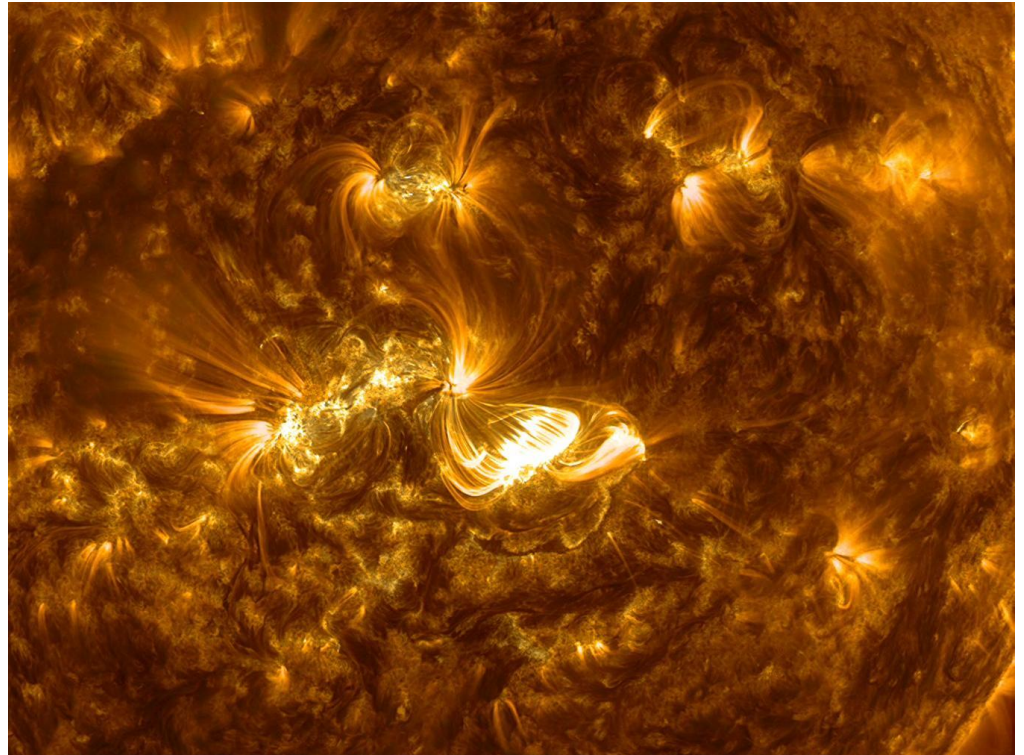
How to visualise your results?



How to visualise dynamic phenomena ...

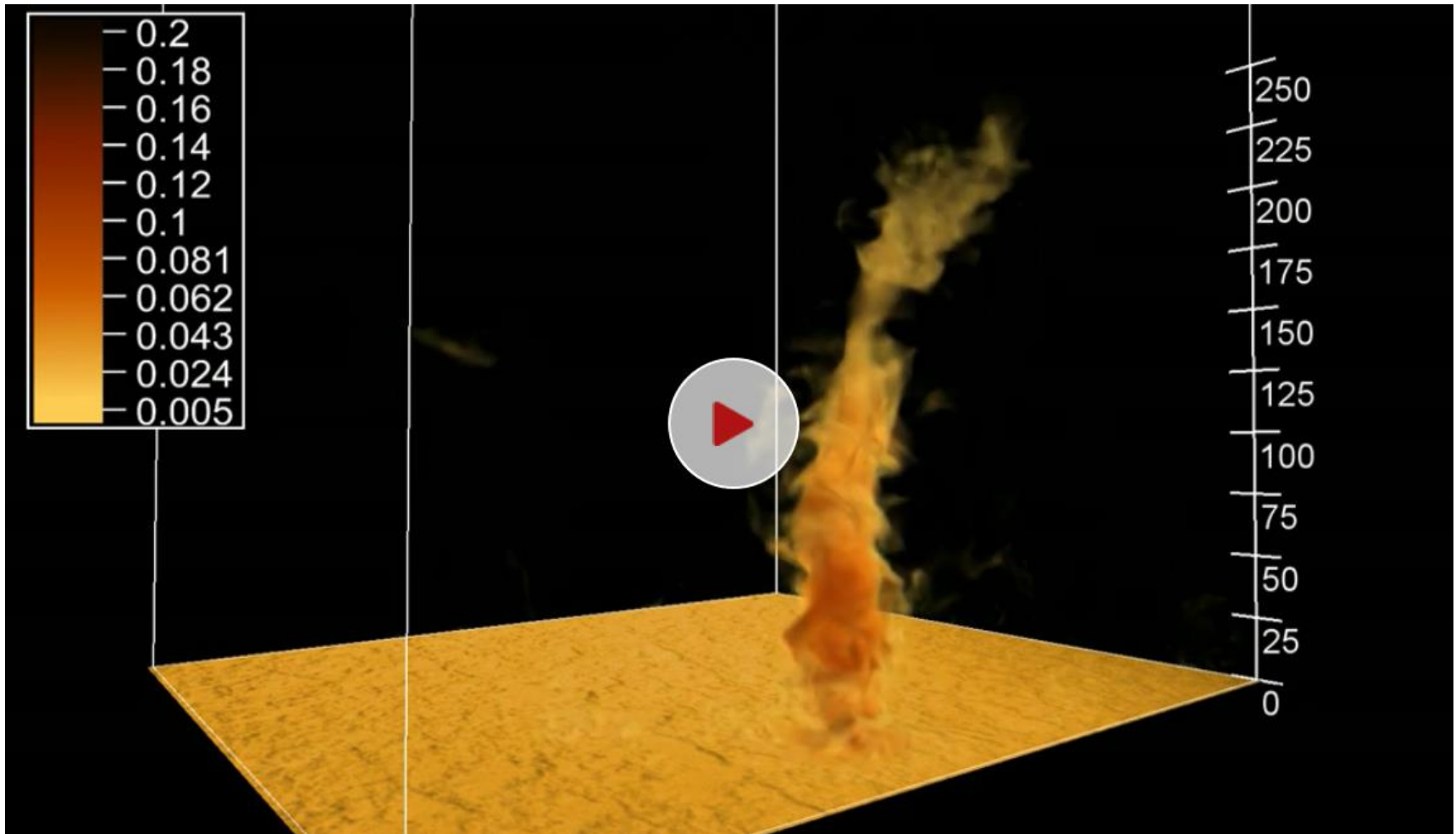
... which are too

- complicated,
- complex,
- unusual,
- full of information,

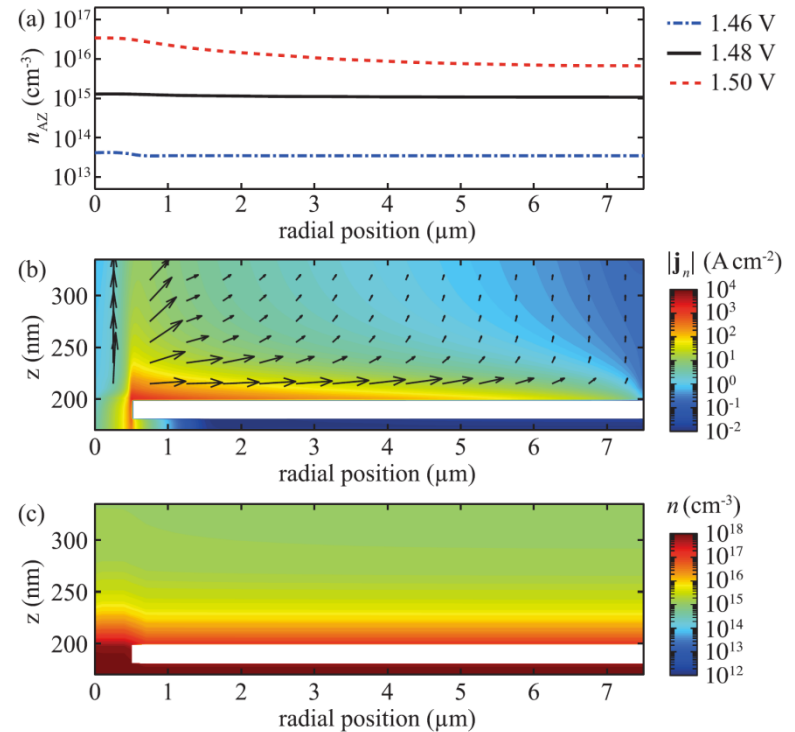
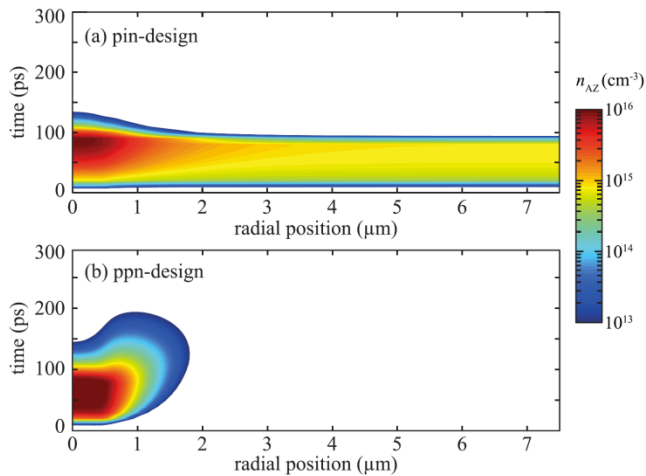
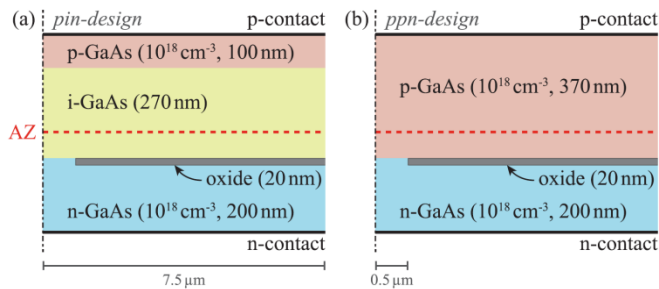


... to describe in words and pictures?

Visualisation of simulations

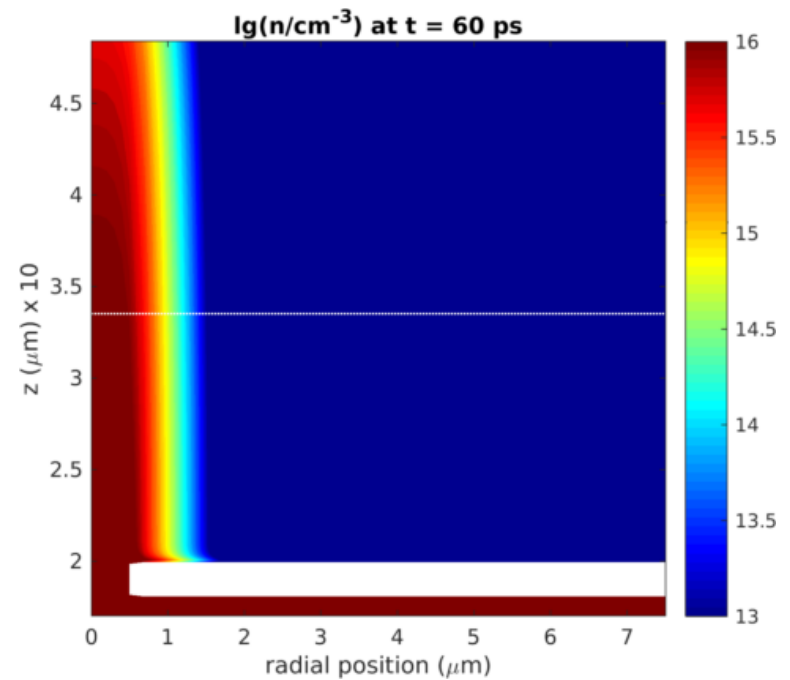
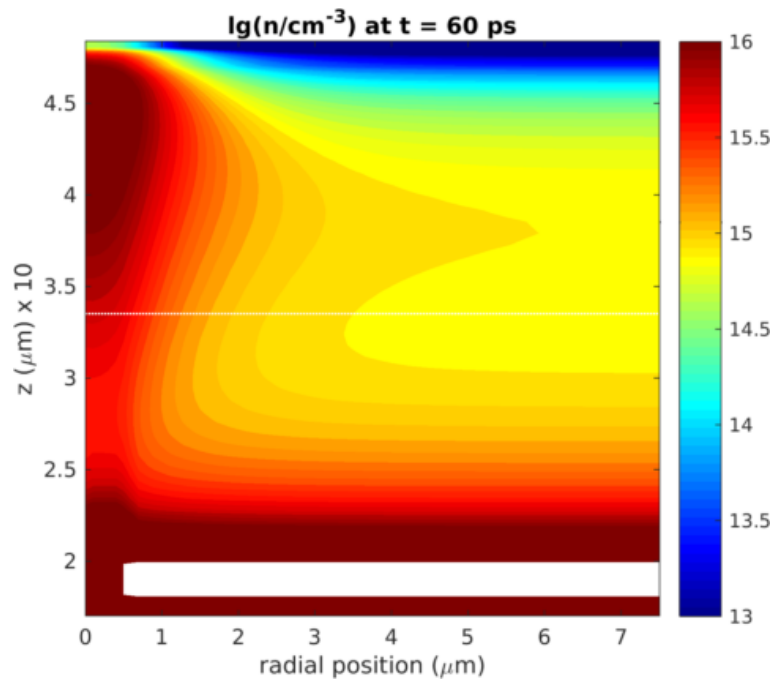
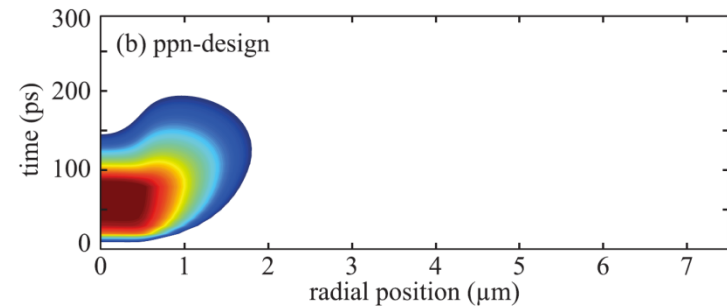
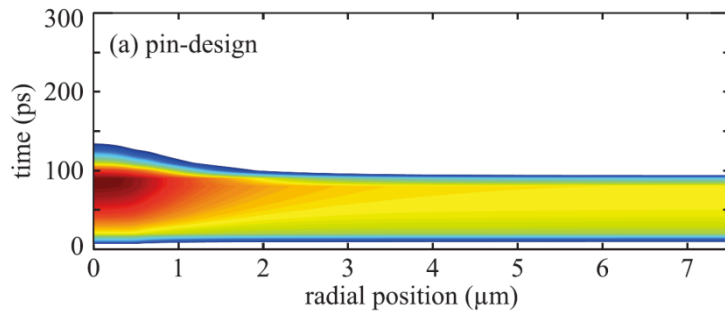


Example: Simulating current injection into single quantum dots



Kantner, et al., *Efficient Current Injection Into Single Quantum Dots Through Oxide-Confined p-n-Diodes*, 2016, DOI:10.1109/TED.2016.2538561

Example: Simulating current injection into single quantum dots



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How to treat Supplemental Videos?

arXiv.org

6. [arXiv:1702.01519](#) [pdf, ps, other]

Diffusion-driven self-assembly of rod-like particles: Monte Carlo simulation on a square lattice

Nikolai I. Lebovka, Ivan Yu. Tarasov, Volodymyr V. Tarasov, Dmitriy A. Dmitriyev, Dmitriy A. Dmitriyev

Comments: 12 pages, 14 figs, 3 videos, 53 refs. Submitted to Physical Review E
Subjects: [Statistical Mechanics \(cond-mat.stat-mech\)](#)

Where?

7. [arXiv:1701.07861](#) [pdf, other]

Diversity and coevolutionary dynamics in high-dimensional phenotype space

Michael Doebeli, Iaroslav Ispolatov

Comments: 49 pages, 6 figures, and 5 videos. Please open pdf with Acrobat to see the embedded movies.
Journal-ref: The American Naturalist 2017 189:2, 169-190
Subjects: [Populations and Evolution \(q-bio.PE\)](#)

Embedded in PDF

8. [arXiv:1701.07769](#) [pdf, ps, other]

Ethical Considerations in Artificial Intelligence Courses

Emanuelle Burton, Judy Goldsmith, Sven Koenig, Benjamin Kuipers, Nicholas Mattei, Toby Walsh

Comments: 29 pages including all case studies and links to video media on YouTube
Subjects: [Artificial Intelligence \(cs.AI\)](#); [Computers and Society \(cs.CS\)](#); [Literature \(cs.GL\)](#)

YouTube

9. [arXiv:1701.07479](#) [pdf, other]

Epidemiological modeling of the 2005 French riots: a spreading wave and the role of contagion

Laurent Bonnasse-Gahot, Henri Berestycki, Marie-Aude Dumas, Mirta B. Gordon, Sebastian Rodriguez, Nancy Rodriguez

Comments: 16 pages, 6 figures, 2 SI pages, 3 SI figures, 4 SI videos (the SI videos are included in the source package, and are also available here)
Subjects: [Physics and Society \(physics.soc-ph\)](#); [Social and Information Networks \(cs.SI\)](#)

Source package

10. [arXiv:1701.07372](#) [pdf, other]

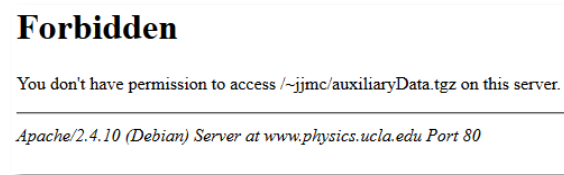
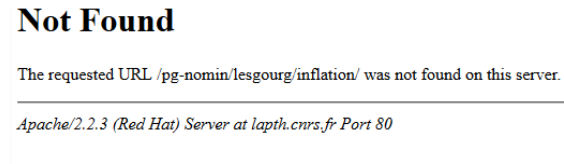
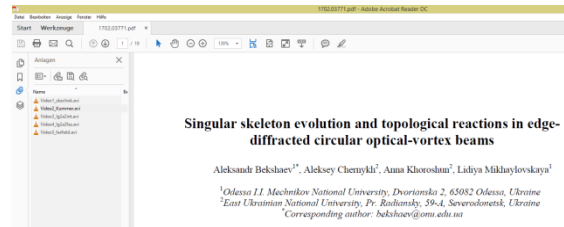
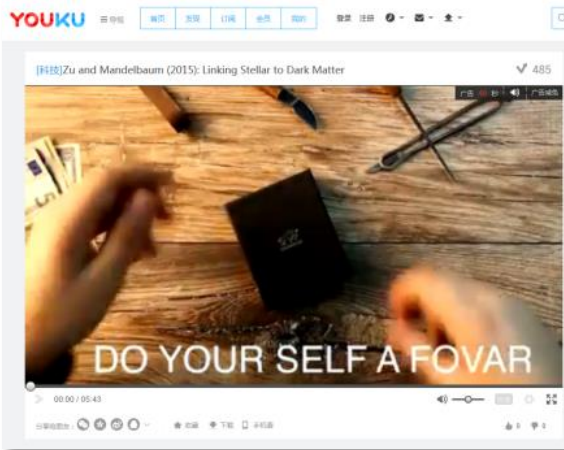
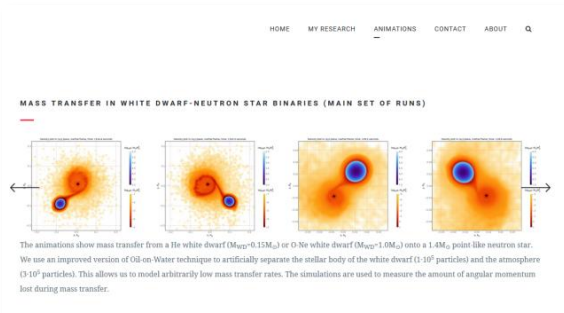
A Multi-view RGB-D Approach for Human Pose Estimation in Operating Rooms

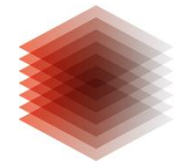
Abdolrahim Kadkhodamohammadi, Afshin Gangi, Michel de Mathelin, Nicolas Padoa-Schioppa

Comments: WACV 2017. Supplementary material video: [this https URL](#)
Subjects: [Computer Vision and Pattern Recognition \(cs.CV\)](#)

Private webpage

How to treat Supplemental Videos?





Preservation of knowledge

- **DOI service** for referencing digital objects
- **Long-term preservation** of scientific media

TIB AV-PORTAL

Spatial Data in the model MOCOSM
Resolution: atmosphere 10 by ocean 10x10

Geopotential height difference (m)

Atm. Temperature (K)

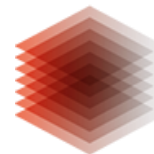
Ocean Temperature (K)

3-D phase space projection (dimensionless units)

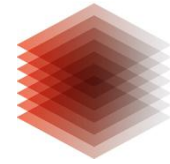
Geopotential height (σ_p) (m)

Ocean σ_t ($\text{kg} \cdot \text{m}^{-3} \cdot \text{s}^{-2}$)

DOI:10.5446/18552



TIB AV-PORTAL



Persistent Linking between Article and Video

Fig. 5. 3D radial distribution of the electron density $n_e(\mu\text{m})$ in the AZ for the p-n design (a) and the p-n design (b) for the p-n design and under the pulse height of 1.0 V and 1.5 V, respectively. The radial position is in μm . The vertical axis is the electron density $n_e(\mu\text{m})$ in cm^{-3} . The vertical axis is the electron density $n_e(\mu\text{m})$ in cm^{-3} . The vertical axis is the electron density $n_e(\mu\text{m})$ in cm^{-3} .

Fig. 6. Schematic of the electron density in the AZ for a p-n design (a) and the p-n design (b) for the p-n design and under the pulse height of 1.0 V and 1.5 V, respectively. The radial position is in μm . The vertical axis is the electron density $n_e(\mu\text{m})$ in cm^{-3} . The vertical axis is the electron density $n_e(\mu\text{m})$ in cm^{-3} . The vertical axis is the electron density $n_e(\mu\text{m})$ in cm^{-3} .

Considering as for the radial homogeneity calculation of the AZ across the whole mesa area in the corresponding design the carrier transport in the p-n design. In contrast, the carrier can be funneled much more to the central QD by using a p-n design with sufficient carrier doping, e.g. $N_A = 10^{18} \text{ cm}^{-3}$ in combination with a small radial thickness of the p-layer. The total carrier increases in these moments. This increase has to be paid to compensate for the larger total contribution. In our simulation, the carrier for achieving $n_{\text{QD}} = 10^{11} \text{ cm}^{-3}$ is about approximately. This factor is not much in light of the electron current funneling as SPN. As a further consequence of doping the AZ, the carrier transport of the QDs will be affected. There the probability of carrier capture is increased. In our simulation, the carrier from the central electron and hole-injection. These general characteristics of QDs exhibit the two features options [22], [23], which is advantageous for single-photon generation.

VIII. PULSED OPERATION

The practical applications of an SPN, the deterministic triggering of each photon emission event is essential. In order to be operated in pulsed operation mode. Furthermore, high repetition rates of the order of GHz are desirable. This requires accordingly fast pump pulses. In this section, we investigate whether the results of current spreading under CW excitation hold for the dynamic case of pulsed operation.

To answer this question, we apply 100 ps long bias pulses with a repetition rate of 1 GHz on the top of a constant bias voltage V_{bias} . The bias voltage is chosen just below the threshold.

VIII. CONCLUSION

We have shown that the carrier contribution by a small injection in an oxide layer can lead under low current injection as applied for single-photon generation with QD based SPN.

Persistent Link via DOI

TIB AV-PORTAL

lg(n/cm^{-3}) at $t = 20 \text{ ps}$

radial position (μm)

z (μm) x 10


00:02 | 00:27

REFERENCES

- [1] C. Santori, D. Fattal, and Y. Yamamoto, *Single-Photon Devices and Applications*. Weinheim, Germany: Wiley, 2010.
- [2] S. Buckley, K. Rivoire, and J. Vučković, "Engineered quantum dot single-photon sources," *Rep. Prog. Phys.*, vol. 75, no. 12, p. 126503, Nov. 2012.
- [3] R. Michalzik, Ed., *VCSSELS: Fundamentals, Technology and Applications of Vertical-Cavity Surface-Emitting Lasers* (Springer Series in Optical Sciences). Berlin, Germany: Springer, 2013.
- [4] W. Utran et al., "Electrically driven single photon source based on a site-controlled quantum dot with self-aligned current injection," *Appl. Phys. Lett.*, vol. 101, no. 21, p. 211119, 2012.
- [5] A. Strittmatter et al., "Site-controlled quantum dot growth on buried oxide stressor layers," *Phys. Status Solidi A*, vol. 209, no. 12, pp. 2411–2420, Nov. 2012.
- [6] H. Gajewski and R. Nürnberg, *WIAS-TeSCA: Two- and Three-Dimensional Semiconductor Analysis Package*, accessed on Mar. 10, 2016. [Online]. Available: <http://www.wias-berlin.de/software/tesca/>

Related Material

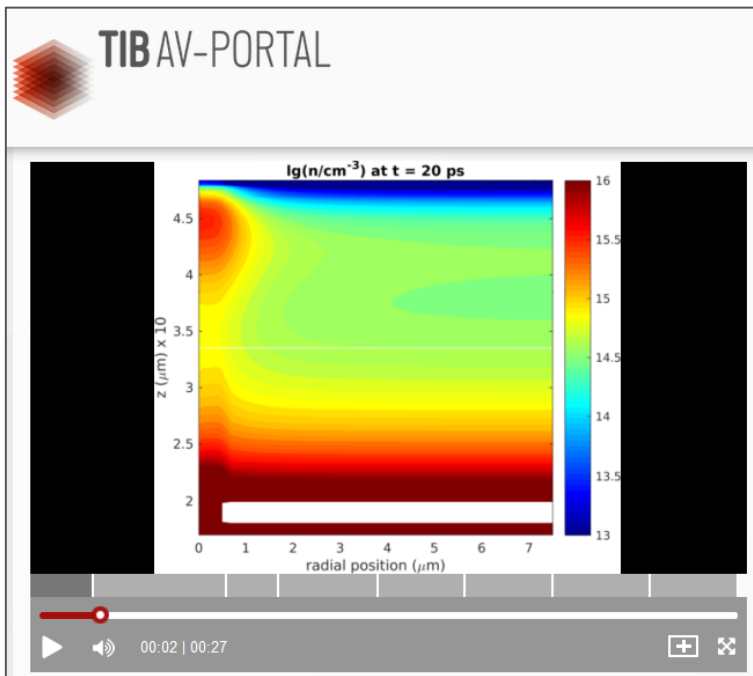
VIDEO IS ACCOMPANYING MATERIAL FOR THE FOLLOWING RESOURCE

 Efficient Current Injection Into Single Quantum Dots Through Oxide-Confined p-n-Diodes [↗](https://doi.org/10.1109/JED.2016.2538561)

DOI: 10.1109/JED.2016.2538561 [↗](https://doi.org/10.1109/JED.2016.2538561)

An Adaptive Semi-Lagrangian Emissions in the Atmosphere

Media Fragment Identifier



000-270ps:

<http://dx.doi.org/10.5446/12345>

000-010ps:

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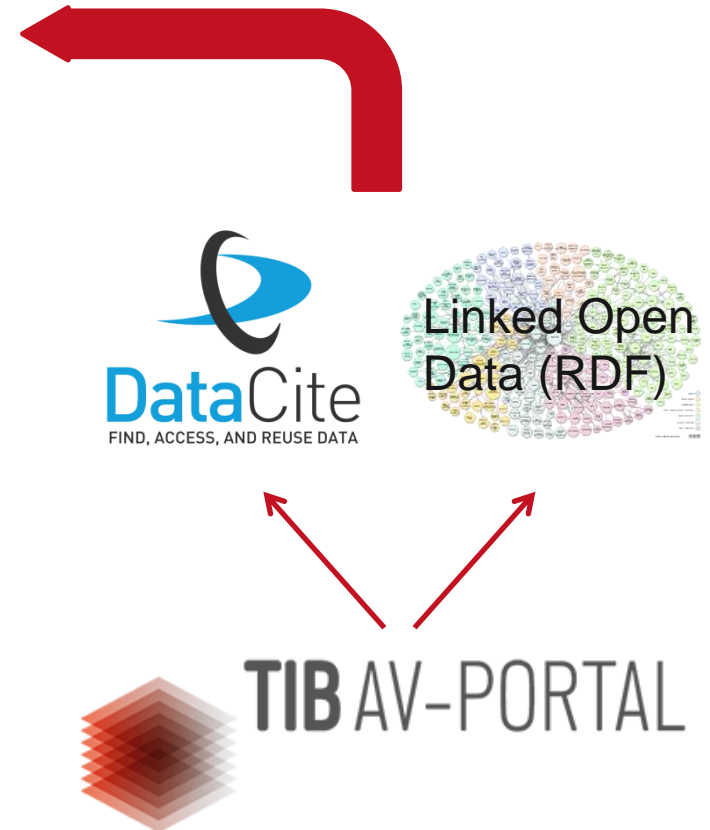
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Visibility of Scientific Videos



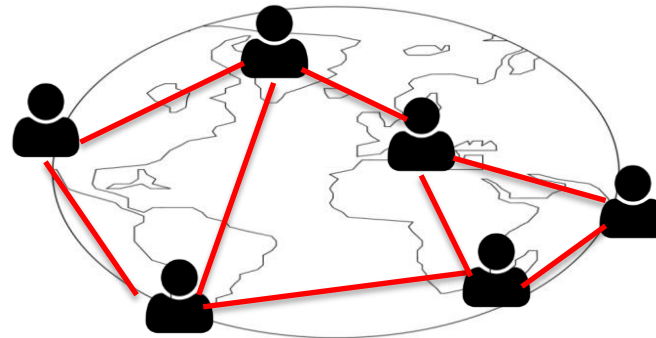
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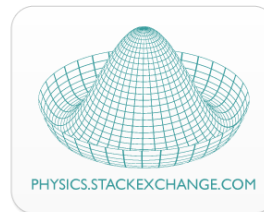
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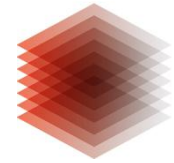
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discover



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ORCID Profile (or ResearchGate, Mendeley, ...)



ORCID Connecting Research and Researchers

3,071,670 ORCID IDs and counting. See more...

Angelina Kraft

ORCID ID: orcid.org/0000-0002-6454-335X

Technische Informationsbibliothek (TIB): Hannover, Niedersachsen, Germany
2013 to present

Country: Germany

Email: angelina.kraft@tib.eu

Other IDs: Scopus Author ID: 36625842500, ResearcherID: E-5011-2011

Works (47)

The RADAR Project—A Service for Research Data Archival and Publication
IJGI
2016-03-04 | journal-article
DOI: 10.3390/ijgi5030028

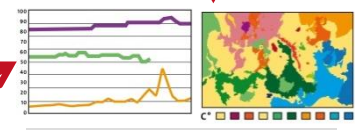
Pteropod sedimentation at HAUSGARTEN central station HGIV from 2000 to 2012, supported by Bauerfeind, Edward Möring, Eva-Maria; Pauls, Bendiks; Kraft, Angelina; Beszczynska-Möller, Agnieszka (2014): Variability in pteropod sedimentation and corresponding aragonite flux at the Arctic deep-sea long-term observatory HAUSGARTEN in the eastern Fram Strait from 2000 to 2009. Journal of Marine Systems, 132, 95-105
2014 | data-set
DOI: 10.1594/PANGAEA.845697

RADAR Project: Data Preservation and Publication
DataCite
2014 | other
DOI: 10.5446/15294

Variability in pteropod sedimentation and corresponding aragonite flux at the Arctic deep-sea long-term observatory HAUSGARTEN in the eastern Fram Strait from 2000 to 2009
2014 | journal-article
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DOI



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DOI

DOI

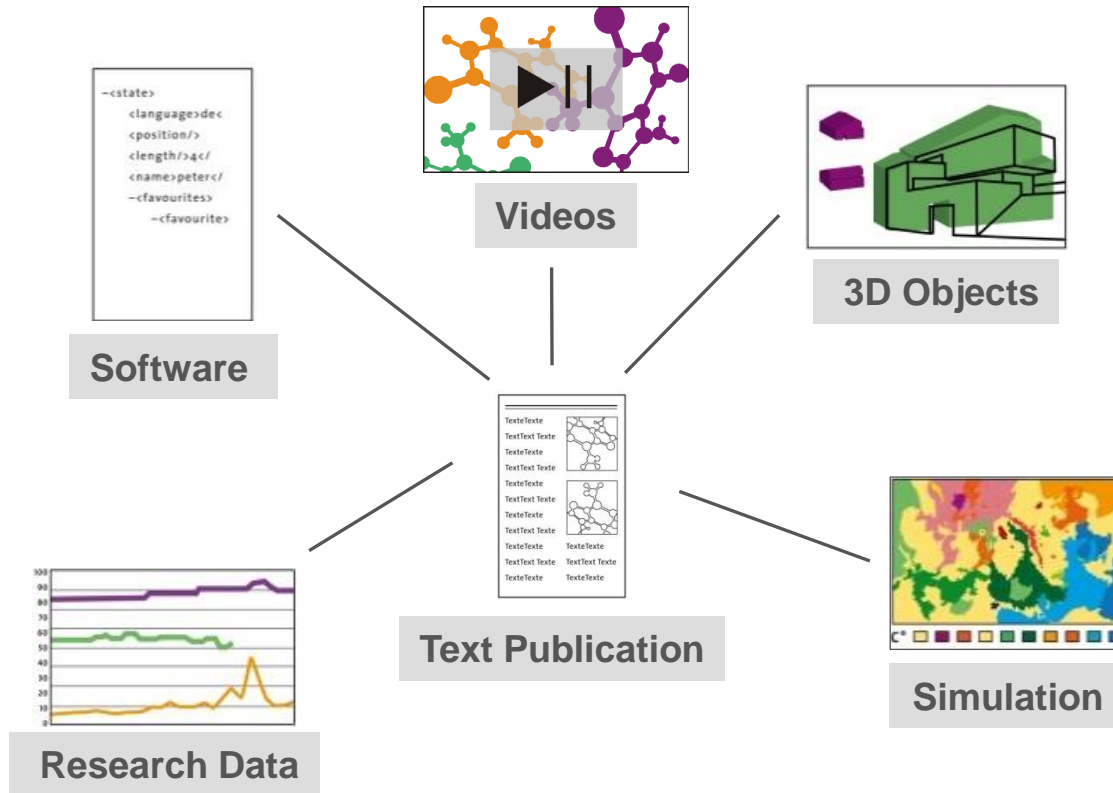
TIB AV-PORTAL

Marken RADAR Project: Data Preservation and Publication

The screenshot shows a video player interface. The main content is a presentation slide titled 'RADAR' with a central logo. The slide lists 'PARTNERS' including 'Software, Instruments & Systems model' (FIZ Karlsruhe), 'Scientific specification & evaluation' (UW), and 'Data management & preservation services' (SKIT SCC). The slide also mentions 'RESEARCH DATA REPOSITORY' and 'TIB Hannover'.

08:21 | 24:54

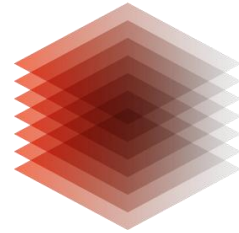
Permanently Connected



Summary

- Visualisations of simulation data are important resources
 - Take care of your visualisations
- Stable and sustainable infrastructure is necessary
 - Citation, DOI, long term preservation, ...
- Videos may increase the visibility of your research
 - Search engine, ResearchGate, social media, Wikipedia, ...
- TIB AV-Portal: platform for scientific videos
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TIB

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