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Information revolution: how ultra-short bursts of light can help us improve data storage

Teaching suggestions

The following questions are suggestions for teachers on how to engage students with the article. Teachers should feel free to select the activities most appropriate to their class, adding or removing questions as required.

Comprehension questions

Please answer the following questions very briefly using key words.

- What type of numbers are used to store data on computers?
- What is an example of a data-rich type of information?
- What are the important features needed for future data-storage solutions?
- According to some studies, how much more energy-efficient could skyrmion-based data storage be compared with current technologies?
- What type of electromagnetic radiation forms the laser beam at European XFEL?

Short-answer questions

Please answer the following questions with 1–3 sentences in your own words.

- Why is the need for data storage growing?
- How are magnetic materials used to store binary data?
- What properties of skyrmions make them an attractive candidate for data storage?
- How do scientists at the European XFEL monitor the formation of skyrmions?

Homework questions

Please research the following questions and write 1–3 paragraphs (max. half a page), citing a minimum of two references for your information sources.

- Research the energy consumption of large servers, e.g., cloud services, email, and social media. What environmental problems are associated with these servers? What proposals exist to minimize or mitigate their environmental impact?
- Research the phenomenon of magnetism. What types of magnetism exist? Which materials have magnetic properties? Describe two examples of how magnetism works, one in nature and one in a human-made technology.