ChatGPT makes the connection

1 Chat GPT, from OpenAI, is just one example of a 'large language model' AI

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2 The 27 km-circumference ring of the Large Hadron Collider lies underground on the France–Switzerland border

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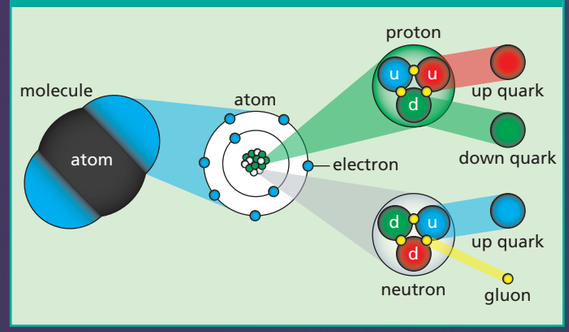
The artificial intelligence (AI) chatbot ChatGPT (1) was launched as a prototype in November 2022, and gained attention for giving articulate, human-sounding answers to questions. As it searches the internet for its answers, they are not always factually correct. OpenAI aims to produce an AI system that can solve 'human-level' problems, but there are many ethical issues around the development of true machine intelligence. For more on this visit:

https://tinyurl.com/AI-ethical-issues

When asked to look for links between topics in this issue, ChatGPT suggested the European Organization for Nuclear Research (CERN — *Conseil Européen pour la Recherche Nucléaire*), based in Geneva on the France–Switzerland border (2).

3 Molecules are made of atoms, which are made of smaller, more fundamental particles



CERN carries out research in fundamental physics, investigating the particles that make up atoms (3).

We can image individual atoms with powerful electron microscopes (4) (pp. 18–22), and CERN uses these devices to study the behaviour of materials under the extreme conditions of its high-energy experiments.

In order to 'see' inside atoms, we need very high-energy particle accelerators. The Large Hadron Collider (5) at CERN consists of a 27 km-long ring of superconducting magnets, which guide beams of particles — protons or ions — travelling at near the speed of light, and collides them to investigate how particles, including quarks (pp. 2–5), interact.

The research at CERN requires enormous amounts of energy, with electrical energy (pp. 6–8) supplied from the French national grid (6). Pylons in mountainous areas, such as in the French Alps, are painted bright colours in order to make them more visible to aircraft.

4 Scanning electron microscope image of gold atoms

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CERN also has its own hydroelectric energy supply (7), and is committed to renewable energy, aiming to reduce its carbon footprint by 20% by 2025.

5 Inside the tunnel of the Large Hadron Collider

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6 Electricity pylon in the French Alps

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7 A hydroelectric plant in Bouches-du-Rhône, France

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