

A synchrotron for neutral molecules

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In the February issue of *Nature Physics*, Gerard Meijer and colleagues at the Fritz-Haber Institute, part of the Max Planck Society in Berlin, report the construction and operation of the first synchrotron for neutral molecules, unlike conventional synchrotrons that can only handle charged particles.

The device could open a new avenue for the study of collisions between molecules, promising unique insights into their physical properties and chemical reactions.

Synchrotrons are devices in which particles move in synchronized bunches in a circular path. They are widely used in high-energy particle physics — in dedicated centres such as CERN or Fermilab — to accelerate charged particles and make them collide. But the device of Meijer and colleagues — which has a circumference of just 81 centimetres — is the first synchrotron to work with electrically neutral particles.

The energies involved are extremely low; the molecules travel with velocities of the order of 100 metres per second, and have a temperature close to absolute zero — a regime of particular interest in the context of molecular physics and chemistry.

The control provided by the new device over the motion of neutral molecules, and the ability to collide bunches of them, could enable an array of experiments that have been not possible so far.

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