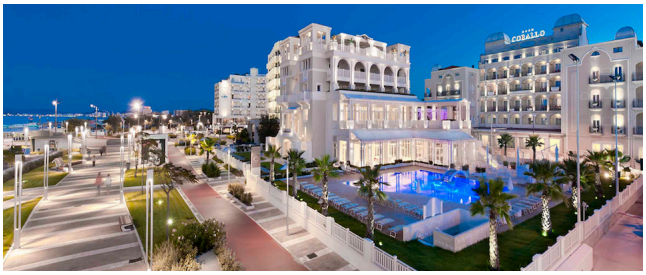

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Formation of Hydrogen Atom Beams during Capture of Electrons by Non-relativistic Protons Channeled in Carbon Nanotubes

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The paper shows that when beams of non-relativistic protons are channeled along the axes of carbon nanotubes (non-chiral nanotubes of the type are chosen, in which the chains of carbon atoms are located in the corners of a regular 2n-gon), the formation of fast directed beams of neutral hydrogen atoms is possible. Consideration of such a mechanism is carried out using the non-stationary perturbed theory under the conditions of resonant interaction of carbon atoms with beams of non-relativistic protons moving at optimal speeds. With the use of calculated wave functions and energy levels of channeled protons, as well as modeled wave functions of electrons moving in the electrostatic fields of carbon nuclei, the probabilities of their capture by channeled protons with the possibility of forming directed beams of hydrogen atoms are calculated.
It should be noted that such beams of neutral atoms can be used, for example, in the implementation of an inertial thermonuclear device or atmospheric probing to exclude the influence of a magnetic field.

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