Exercices physique atomique pdf

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Reviews are not available. Excerpts are not available. Find an expression of the magnitude of the energy of a hydrogen atom (a_0) from the uncertainty 1.2 principle. Let's recall the heisenberg uncertainty principle (formulation in order of magnitude): We can also do here: recognize that: Delta p-approx-sqrt-2 m- E): medium kinetic energy, based on the order of the average potential energy (Coulomb Law) E-frac'q-q-2 a_0-sim-frac'4-varepsilon_0-frac{1} a_0 Then: phrase, phrase: which will often collide varepsilon_0 ed, systematically represents the order of energy associated with the movement of electrons. 2. Energy 2 2.1. The statement is a standardized approach solution Hamiltonian, whose exact solutions are: 'beginning' aligned' E_0, E_1, E_i-aligned Own values (E_i) are classified in increasing order of energy. The own 'widehat' functions, which form an ortonorized basis, you can ask: 'psi'tierle'sum_i c_i-i-rangle) calculate the average value "(psi') relative to '(widehat-E_0'). 2.2. The answer is that E-langle'-widehat-H-psi-tierle as psi is standardized, can write: E-E_0-langle-psi-hat-H-psi-rangle-E_0-langi-psi-sedle-langle-psi-hat-hat-h-psi-rangle-E_0 langle-psi E_0 E_0 It is also known that P E_0 si-rangle sum_i c_i-i-rangle) can be written: sum_i c_i-langle i-Big-Hat-E_0-Big sum_i c_i -I-sum_i c_i-c_i-big-langle i-hat-H-I-rangle-langle i E_0-it-big-sum_ic_i-c_i-big-langle i E_i-E_0-i-rangle-big-big-sum_i c_i c_i-c_i-E_i E_0-end-end-aligned) hypothesis E_0'lt;E_i, the average value of the solution is always approaching more than the energy (E_0) of the fundamental state. Note 2 there are basically two mathematical tools for optimizing decisions depending on whether one starts with a decision approached by Hamilton or the exact solution Hamilton came up with. Thus, unlike the previous calculation, the infringement method is this: we have accurate solutions E_i Hamiltons, and we are looking for solutions for the values 'widehat') obtained E_i in the form of widehat. consecutive orders 1, 2... From E_i: E_i-langle i'E_i-E_i-E_i 1-E_i-2-dots: qlt-1-sum_-jeq i-frac-langle i-widehat-h-tierle-2-E_i-E_j-0-quad-dots. Energy 3 3.1. Statement Potential Well: Potential energy is like a violation. Determine the energy level in a potential well (width) on a small dimension. We assume that: USA.2 (text for 'ka'lessapprox 1)) 3.2. The answer let's remember the expression of schroedinger's equation in general: in the second member (1), can be neglected in the area well, and believe that psi) is permanent. For this constant, value 1 can be admitted, without limiting the overall side of the equation: Let's include this equality on two -2m-hbar (x)-qquad (2) between two x_1 points, such as: x_1 'a'll' t-chi-qquad-qquad-kappa-frac-frac-sqrt'2-m-hbar' , integration can be extended to the right to the entire region from indie to oil: 'frac'dx-x_1 x_1 int_ <1> <7>-1-frac'2-m-hbar-2-int_-infty U (x)-dx-qquad (3)) Away from the well , Wave function written: 'psi'exp('pm'kappa-x) After the substitution in (3): '2'kappa'-frac'2-m-hbar-2-int_-infty-u (x)dx and we see, according to our hypothesis, that the size of the int_ level is indeed a small amount of a higher order (from second to deep). 4. Spectroscopy 1 4.1. Statement Calculation, in electron-volt (eV), ionizing the energy of the hydrogen atom, knowing bar - 1.5233 10-10-6 cm the number of waves of red beam (H_-alpha) series hydrogen Balmer. 4.2. The Solution Number of Wave Waves of the Hydrogen Atom Spectrum Is Given: R_H-Large{1}-n_1 2-frac{1}n_2 2-Big-qquad n_2'gt'n_1 (R_H): Rydberg's Hydrogen Constant Recall different series of hydrogen atom spectrum series: 'The beginning' aligned' n_1 '1.n_2's variable text 'text' series 'remote UV text' -n_1 '2, n_2 'variable text' 'text' 'Balter' 'UV' 'n_1'3 n_2 'text' 'variable' 'text' 'paschen's series 'text' about 'n_1'4,n_2 Variable text - 'Text', series of braces 'IR'a far away', 'n_1'n_1'n_2 'variable text'-text-series 'IR' -text-far-end-4.2.1. Calculation Rydberg Red stripe H_ in the Ballmer series corresponds to the values of N_1 - 2; n_2 - 3. Wave count: R_H Big{1}{4}-Frak{1}{9}-Big{1}{4}-quad-rightarrow-four R_H-1,096-77-times 10-7-m-1-2.2. Calculating the energy of energy ionization of energy energy, which must be put on the electron of the atom, taken in its most connected state (n_1-1) to remove it completely from the atom (n_2-infty). This energy is that photons, the number of waves, what is the limit of the Limann series: _i R_H-Big (frak{1} -1-2-frac{1}-infty-large) R_H Energy is associated with the number of waves associated with the number of waves : Planck Constant ((6,626-07-times 10-34)) Speed of Light (2,997-92-times 10-8-rm m-1)) Use joul-electron-volt correspondence: 1-rm eV-1,602-176-times 10-19-J One receives, all calculations are made: E_i 5. Spectroscopy 2 5.1. Statement In a short series of wavelengths of the ionized helium atom spectrum, the first beam has a series of waves ('bar'3,291-67-fold 10-5-rm m'-1). This sweeps out the ratio of electron mass to hydrogen nucleus mass. 5.2. Solution 1) Atomic helium is - 2. Or R_ Rydberg's constant for an ionized helium atom, Wave numbers of the shorter wavelength series are expressed in the shortest series of wavelengths: 'R_'He-2-Big ('frac{1}'2-frac{1}-n-2 Number of waves in the first ray: R_-He-He-times 4-Big (1-Frac{1}{4}-Big) -3-R_-He-) Digitally (R_-He-1,097-223-times 10-5-rm m-1). 2) Rydberg's constants for ionized hydrogen and helium atoms are given appropriate formulas: R_H 2-foot-2-mu_H-h-3-qquad-qquad-R_ He mu_ mu_ mu_H was a reduced electron mass in hydrogen and helium atoms, accordingly. : frak{1}-mu-frak{1}-frak{1} M-Ruznarrow-mu-M-M:mass in the rest of the electron (M) is therefore proportional to M'm'm: the mass on the rest of the electron (M): Thus, the mass of the considered nucleus (R) is proportional to the mu : and you can write: Frak R_-R_H-frak mu_-mu_H M_ He M_'he-m-frac M_H M_H'm All calculations made, we get: M_H M_-he-frac-R_-he-R_H-M_-R_H-R_H-M_H R_H-M_ R_ for digital use: fracs m'M_H {1}-1835.7- 6. Relativity 1 6.1. Statement 1) Taking into account the change in mass at speed, it will be shown m_0 the mass of the particle phrase: m_0-frac{1}{2}-Big-frac-2-E_c-E_c-Big Time (number of movement): E_c of kinetic energy (difference between total energy and resting mass) - (c) for a certain particle observed at high altitude in the atmosphere: E_c MeV-qquad-qquad p-325-325-Mev that the 'p', rated by the 'eV/c' unit, is equal to '325'times 10-6). Calculate the resting mass of this particle, as well as the ratio of the previous mass to the resting mass of the electron (9.11 times 10-31) kg). Tell me what a particle it is. Recall that the unit of mass used in nuclear physics (1.66-10-27 kg) is equivalent to 931 MB. 3) Finally calculate the ratio of particle speed to the speed of light. 6.2. Решения 1) Мы собираемся рассчитать количество двух-половина-к-быть: с 'beta'v/c): общая энергия частицы Можно написать: "p'2'2-E-2-E-2-(1-бета-2)-E-2-2-2 -2-m_0 4-(1 Золото: Золото: Золото: «E-E_c-m2-2-2»Так: «P-2-2-E_c-2-E_c m_0 И, наконец, (что должно было быть продемонстрировано): (m_0c 2-frac{1}{2}(frac-2-E_c-E_c)) , эта формула дает: M_0-2-frac{1}{2}-Big (Frac-325-2-{215}-215-Big) Или, в массовом порядке: m_0-frac-138-раз 1,66 раза 10-27-{931} 2,46 И это, как мы получаем:c'm_0 m_e 270' 3) Мы начинаем с «p-c-c-c-c-m-c-c-2-frac-v-c-qquad-text» c: «четверка m'c'2'm_0'E_c» В цифровом виде: Все расчеты сделаны: «frac'v-frac{325}{353}-0.92-7. Violations 1 7.1. Hamilton System Statement: WidehatH_0-widehat-V-given-in-straight-H_0'pmatrix' a'0-b-0-b-0-b-end-pm-p-pm 'four', 'widehat'V', 'start'pmatrix', '0'0-alpha-0-beta-0 'end'pmatrix', 'qquad a'eq-quad-alpha-eq-beta' - Apply the theory of violations to the calculation of energy levels. 7.2. The Diagonal Matrix solution (widehat-H_0) has its own (obvious) meanings: 'mathcal': simple self-importance' ('mathcal'E'1-b'): double its own value 'a-lambda-0-0-0-0': 0-0-lambda-0-0-0-lambda 'end-vmatrix' (a-lambda) (b-lambda)-2-0' Appropriate own vectors: 'varphi_0's') 0, 0) 'varphi_ '1.1') '0, 1, 0) (0) (varphi_ 0, 0, 1) 7.2.1. A simple matter of pure meaning (a) from energy to order 1: 'E_0', or 'varphi_0'varphi_0-rated: '(1-00)-time 'start'pmatrix' 0.0 Alpha -0-beta-beta-0-end-pmatrix-time (1-0 --0) (0-alpha)-time (1-0-0) (E_0: E_0(2)-sum_-J-1.2-frac-langle-varphi_-1 , I varphi_0 E_1-E_1-varphi_ E_0-1.0-varphi_-varphi_ varphi_0-varphi_0-a-b---frac-langle-varphi_-1.2-widehat-V -- varphi_0 varphi_ First matrix multiplication: 0-1-0)times 'start'pmatrix' 0-alpha End-pmatrix -times (0-0-beta) -time (1-0-0) : '0-0-1)'-time 'start'pmatrix' 0-alpha-0-0-beta-0-end-pmatrix' (alpha beta-beta)-time (1-0 And this happens {2} E_0: E_0-e-e-frac'a-alpha-alpha-2- and it comes: E_0-e-e-frac'a-alpha-2-a-b-) Function, specific to order 1, (psi_0): 'psi_0'sum_-sum_-1.2-frac-langle-varphi_-1,I varphi_0-E_0-E_1-E_1-varphi_-1,J-rangle) Which gives (two terms) psi_0 --1-rankle 'frac'varphi_ '1.1'-widehat-V-varphi_0-rankle-a-b-----1 varphi_ '1.1'-rankle 'frac'langle-varphi_ '1.2'-widehat-V-varphi_0-rankle-a-b-varphi_-1.000 Only second term remains : Psi_0-frac-alpha-a-b-varphi_-1.2-rangle Psi_0 varphi_0 -rankle-alpha-a-b-varphi_ 7.2.2. Double-of-self value (b) We first limit 'widehat', 'widehat') to the subspace of degeneration. This is the matrix: Widehat-V acts on three-dimensional space. (V_1) acts on a two-dimensional space. Calculating your own values: 'text'det'widehat'V_1 'start'vmatrix' --lambda 'end-vmatrix' Hence two different own values: 'lambda') In limiting space from dimension 3 to measurement space 1: vector (0, 1, 0) is vector (1, 0); vector (0, 0, 1) - vector (0, 1). The 'widehat' matrix V_1 has its own meanings and the following own vectors: 'Frac{1}'sqrt{2}'s (1,1,' 'The 'sqrt{2}' was introduced to normalize the vector: Frac {1}-sqrt{2} varphi_-varphi_-1-varphi_-1.2-rankle-quad-text and four{1}-sqrt{2} operator's own energy and 'widehat' varphi_ vectors, varphi_-1.2-rating' E_0; E_ E_-psi_1psi_1sle; psi_'s 'text'and 'psi_-rangle': 'E_"" with: E_pm'a'pm'd with: psi_ {0} <8>-{1}-{2} varphi_ 1.1 varphi_ 1.2rangle' psi_ - {0}-1 -{1}-{2} -varphi_ 1.1-varphi_.1.2'rangle' () 8. Потенциальная хорошо 1 8.1. Заявление Частица рассматривается в хорошо не бесконечной схематического потенциала показано напротив. E: 'Psi (x,t)-varphi (x)-varphi (x)-varphi (x)-exp-Big (-i-frac'E-t-hbar-Big) ' 'varphi_1 (z) -z-in-Big'--fracy'{2}-Big varphi_2 1'lt;1 It's been a good time (z) -z-in-Big'-frac'a-{2} -frac'a-{2}-Big varphi_2 Big'frac'a-{2}-infty-Big' '(R3)') 1) It's not going to be the last time you like to be. 2) Отслеживать функции волны, а также вероятности присутствия частицы. 8.2. '8.2' 'E U_0 0' 'E0' let's ask: '[k's-frac-sqrt'2'm'E'hbar'qquad q'e-frac'2-m-sqrt-U_0-E'hbar'] the three differential equations have for expressions: varphi_1 (U_0-E)-varphi_1-varphi_1(z)-2-U_0-2-varphi_1(z)-q-q-varphi_1 (r_1 z) 2-varphi_2(z)-partial-z-2--frac-2-m-E)-hbar-2-varphi_2(z)-k-varphi_2(z) and (r_2) -frac partial varphi_3 (z)-partial-z-2-frac-2-M (U_0-E)-hbar-2-varphi_3(z)-q-q-varphi_3(z) and (r_3-end-aligned] [begin-aligned varphi_1 (z)-A-exp (q-z) -B-exp (-q-z varphi_2) (z) -C-exp (i-k-z) -D-exp (-i-k-z varphi_3) (-q-z) -end-aligned) as the wave function is symmetrical or antisymmetric, one will have: [begin-aligned and textsyometry:::::E-E and antisymmetric In reality, as the probability of presence cannot be infinite, one must be found in: /U_0). "z': "'varphi_1 varphi_2 'B'cos (k-z) - 'varphi_3 'A'exp (-q-z) - 'A'er 'varphi_1 'A'exp (q-z) - 'varphi_2 'B'sin (k-z) - varphi_3 varphi_2 'Phi_n (z)'2 ('2). 2017-10-08 2017-10-08-lt;/0-qquad-text and -qquad-exp (-q-q-z) exercices physique atomique pdf. physique atomique exercices corrigés pdf. exercices corrigés de physique atomique. physique atomique l3 exercices corrigés pdf. exercices corrigés de physique atomique bernard held pdf. exercices corrigés de physique atomique bernard held. exercices corrigés de physique atomique et nucléaire. exercices et corrigés de physique atomique

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