($m^*/m = 4 \pm 1$) [5] we have

$$UN(E_F) = 0.035 \pm 0.012. \quad (2)$$

According to the latest data [21, 22] the density of states on the Fermi surface of palladium is 2.281 ± 0.171 eV^{-1}, and the doubled width of the 4d-band is 1.29×10^{-4} eV. Using formula (2), we get $B = 0.013 \pm 0.007$. Extrapolation of the relation $kT_m/U = f(B)$ to $B = 0.013$ yields

$$\frac{kT_m}{U} = 0.38. \quad (3)$$

From (3) we get for the disorder temperature of the paramagnons $T_m = 70 \pm 30$°K. The obtained value is close to the experimentally obtained 93 ± 5°K.

The shapes of the anomalies of the $\alpha_a(T)$ and $\alpha_\rho(T)$ curves near T_m point to singularities characteristic of a second-order phase transition.

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TEMPERATURE DEPENDENCE OF MULTIPHOTON IONIZATION OF THE HYDROGEN MOLECULE

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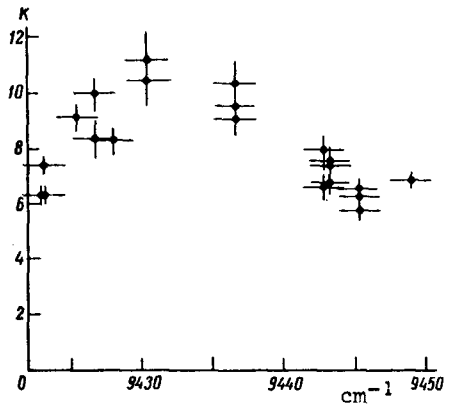
The resonant action of laser radiation on molecules is of great interest, being a new physical phenomenon of great practical importance [1]. An



experiment performed by us makes it possible to observe the resonant character of multiphoton ionization of the hydrogen molecule.

We used in the experiment a neodymium laser with variable frequency, operating in the giant-pulse regime. The frequency was varied with the aid of a compound resonator incorporating two Fabry-Perot interferometers operating in transmission. The generation line half-width was 3 cm^{-1}. The generation frequency changed by 25 cm^{-1} in the range from 9423 to 9449 cm^{-1}. The laser radiation was focused inside a vacuum chamber filled with hydrogen to a pressure $\sim 10^{-5}$ Torr. Under such conditions, during the time of the laser pulse ($\tau \sim 10^{-8}$ sec) no collisions occurred between the electrons and molecules or between the molecules themselves in the focusing region of the laser radiation ($d \sim 100$ μ). The ions produced in the radiation-focusing region were accelerated in a weak constant field (~100 V/cm), were mass-separated in the flight gap, and were registered with an electron multiplier. The radiation intensity in the focusing region was determined by measuring the energy passing through the focusing region in the laser radiation pulse, the spatial distribution of the radiation in this region, and the distribution of the radiation over the duration of the giant pulse. The radiation intensity was varied by attenuating the radiation at the entrance to the chamber, using filters of covered optical glass. The experimental procedure is described in greater detail in [2].

At different radiation frequencies, we measured the number of produced ions (in relative units) as functions of the radiation intensity F. For a comparison of the results obtained at different frequencies, the $N_i(F)$ dependence was approximated by a power law $N_i \sim F^K$.

At all radiation frequencies, the maximum electric field intensity of the laser radiation was $E = (7 \pm 2) \times 10^7$ V/cm. The measured exponents K of the power-law dependence, as functions of the radiation frequency, are shown in the figure. A slight change of the radiation frequency (by a fraction of one percent) produced a sharp change in the character of the multiphoton ionization process. The value of K ranged from 6 to 11. The number of quanta whose absorption is needed for the ionization of the hydrogen molecule is

$$K_0 = \langle I/\hbar\omega + 1 \rangle = 13.$$

Exponents $K < K_0$ were observed earlier also in an investigation of multiphoton ionization of atoms. The reason for such a phenomenon has by now been observed experimentally, namely, resonance between the energies of several quanta and the energy of the bound state of the electron in the atom [2]. In the case of resonance, the ionization process proceeds in two stages: multiphoton resonant excitation of the atom (molecule) followed by ionization of the excited atom (molecule). The change of the exponent of the power-law dependence is a consequence of the Stark shift of the resonant level and of saturation of the second stage of the transition, which involves a relatively small number of photons [3].

It is natural to assume that in the case of multiphoton ionization of the hydrogen molecule the difference between the exponent K and the number of absorbed quanta is connected with resonance or with resonances. This assumption is confirmed by the strong frequency dependence of K. It is much more difficult at present to relate this phenomenon unambiguously with a concrete

resonant process. An analysis of the hydrogen-molecule spectrum shows that there is no resonance with the vibrational levels of the ground state. Parity-allowed resonant electronic transitions can occur upon absorption of 11 quanta ($1^1\Sigma_g \rightarrow 2^1\Pi_u$) or 12 quanta ($1^1\Sigma_g \rightarrow 3^1\Pi_g$) of the neodymium-laser radiation. The presence of rotational and vibrational degrees of freedom of the excited electronic states increases the number of possible resonant transitions, a fact which also makes the interpretation of the experimental data difficult, but does not contradict the hypothesis advanced above. For a further investigation of this effect it is necessary to increase the interval of frequency variation, to decrease the width of the radiation line, and to measure the resonant dependence of the probability of multiphoton ionization on the frequency.

It should be noted that the strong frequency dependence of the character of the multiphoton ionization process points to difficulties in interpreting the experimental data obtained earlier [4] at a fixed radiation frequency, and in the case of a neodymium laser, at a broad ($\gtrsim$10 cm^{-1}) generation spectrum.

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INFLUENCE OF MAGNETIC FIELD ON THE SPECIFIC HEAT ON GADOLINIUM IRON GARNET IN THE VICINITY OF THE MAGNETIC COMPENSATION POINT

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We report here on the possibility of experimentally observing the rotation of magnetic sublattices of rare-earth iron garnets in the vicinity of their magnetic compensation point, on the basis of measurements of the temperature dependence of the specific heat in a constant magnetic field.

It is known that the magnetic structure of rare-earth iron garnets (RIG) consists of three magnetic sublattices. Two sublattices consist of Fe^{3+} ions in an octahedral and tetrahedral surrounding of oxygen ions. The ions in tetrahedral positions constitute the {a} sublattice, and the ions of the octahedral site the {d} sublattice. The third magnetic sublattice consists of ions