ents caused by the exothermal character of the reaction. A model describing the second mechanism of the autowave process is proposed. The fundamental difference of this model from the combustion equation[3] is that the thermal source Q depends in this case not on the temperature, but on its gradient. Such the heat liberated in the reaction is released only in response to the brittle destruction of the sample by thermal stresses exceeding the yield strength of the material, the quantity Q was presented in the form of a function which changes abruptly from 0 to Q^* at some critical $dt/dx = (dt/dx)^*$ and remains constant at this value while the temperature in the wave front reaches its maximum. An important property of the solution of such an equation is its nonuniqueness. The existence of two steady-state regimes of propagating waves, which differ in speed of propagation of a wave front and in its structure was predicted. Both these waves have been observed experimentally, and this supports the validity of the concepts being developed (see Fig. 1).

In qualitative agreement with these concepts is also the fact that the compression of a sample from all sides (which leads to its hardening) led to an almost triple decrease of the wave velocity. The structure of the wave, as could be expected, changes with increasing pressure: the maximum gradient in the temperature profile of the wave shifts in the direction of maximum heating.

The question of a possible influence of plastic deformations was studied by varying the loading dynamics of the samples. The brittle destruction of a film caused by a strike of a pin led to the formation of an autowave, while slow loading of the same pin ($\sim 10^3$ Pa/sec) led to plastic deformation in the area of the pin, but an autowave was not formed in that case (see also Ref. 4).

The observed autowave regimes of propagation of cryochemical reactions demonstrate the peculiar mechanochemical energy chain: plastic deformation—brittle destruction—chemical reaction—plastic deformation.

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V. B. Braginskiĭ and L. P. Grishchuk. *Gravitational wave astronomy.* The present-day state of gravitational-wave astronomy is characterized by reliable observations of indirect manifestations of gravitational waves (secular variation of the orbit of the double pulsar PSR 1913 + 16), by the recognition of the significant role of gravitational radiation in specific astrophysical phenomena (evolution of close double systems and the formation of type I Supernovae, by the use of theoretical predictions of the density of energy of relict gravitational-wave noise in order to obtain meaningful limitations on the parameters of models of the early Universe, by the persistent improvement of methods of laboratory detection of gravitational waves of cosmic origin.

Modern experimental programs are oriented mainly towards recording pulsed and periodic radiation. Powerful pulsed or quasiperiodic radiation is produced by explosions of Supernovae, by merging of neutron stars and white dwarfs, by possible processes with participation of black holes. The indicated processes are very rare in our Galaxy, and in order to obtain a reasonable number of events during the observation period (several events per hour) it is necessary to increase the sensitivity of detectors up to $h \sim 10^{-22}$–10^{-24}, in order to include within the sphere of observation galaxies located at cosmological distances.[1]

The stochastic background of relict gravitational waves deserves special attention.[2] The spectrum of this radiation can be very broad (from 10^{-18} up to 10^{12} Hz) and can contain an energy density ε_g capable of being recorded. Some models of the early universe must be excluded already now, since they predict unacceptably high density of energy of relict gravitons in the high-frequency or low-frequency range. The inflationary model of the early Universe predicts $\varepsilon_g \approx 10^{-8}\varepsilon_\gamma$, where ε_γ is the energy density of the 3 degree black body radiation. Such a background may turn out to be attainable for the projected laser interferometer on a cosmic base of 10^6–10^8 km.

The creation of large ground-based laser-interferometric antennas prototypes of which have been built in several countries, should make possible reliable registration of a large number of gravitational signals (possibly in the years 1990–2000). Other directions of development of experimental methods include improvement of solid-state antennas and construction of stable frequency standards, $\Delta f/f \approx 10^{-17}$.[3] Development of the theory and principles of operation of a compound crystal antenna in order to attempt to observe the relict gravitational-wave noise in the high-frequency range ($\gamma \sim 10^{10}$–10^{11} Hz) appears to be promising.

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