

COLLECTIVE EXCITATIONS OF THE QUANTUM
UNIVERSE AND THE PROBLEM OF DARK
MATTER AND ENERGY

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S u m m a r y

We make an attempt to give an answer to the question of modern cosmology about the nature of the dark matter and energy in our universe. On the basis of our quantum cosmological approach, proposed in 1997—2002, we show that there can be two types of collective states in the universe. One of them relates to a gravitational field, another is connected with a matter (scalar) field which fills the universe on all stages of its evolution. The collective excitations of the scalar field above its true vacuum reveal themselves mainly in the form of dark matter and energy. Under the action of the gravitational forces, they decay and produce the non-baryonic dark matter, optically bright and dark baryons. We have calculated the corresponding energy densities which prove to be in good agreement with the data from the recent observations.