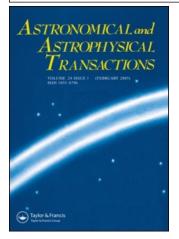
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### BOSE INSTABILITY AND PHOTOIONIZATION OF BOUND LEVELS OF COSMOLOGICAL BLACK HOLES BY HAWKING RADIATION

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Bose instability of rotating (Kerr) and charged (Reissner-Nordström or Kerr-Newman) Black Holes (BH) [1-3] is related to the increase with time (~  $s^{\lambda t}$ ) of small perturbations of Bose mass field, corresponding to superradiative, quasibound states with energies  $E \leq \{\mu, m\Omega_H\}$ , where  $\Omega_H = a/2Mr_+$  is the angular velocity of the BH [4]. The dumping of the angular momentum of the BH is due to the occurence of processes of self-induced production of boson pairs and accumulation of bosons in superradiative quasi-levels. The minimal time of the dumping of the angular momentum in the envelope  $t_{\min} \sim 96\mu^{-7}M^{-8}\ln(M/M_{\rm pl})$  for  $\mu M \ll 1$  (the system of units c = h = G = 1 is used) may be much less than the time of the dumping of the angular momentum by superradiation.

The analysis of boson (scalar) instability for charged BH's shows that

i) the Reissner-Nordström BH is stable, because there are not superradiative quasi-bound levels in this case;

ii) Boson instability of the Kerr-Newman BH is due exclusively to the rotation of the BH, implying the dumping of the angular mometum;

iii) Bose instability may cause an increase of the charge of a BH until the strong electrodynamical discharge by pairs production begins [5-6].

Using the well-known results of quantum electrodynamics for hydrogen-like atoms in flat space-time for the estimation of the cross section of photoionization for electrically charged particles on bound orbits near a black hole, one can obtain for the 2P level:

$$\sigma_A(\omega) = \frac{2^8 \alpha}{3\mu} \frac{(I_{\rm ion}^{2p})^{7/2}}{(t_i \omega)^{9/2}}.$$

The ejection rate for such particles, accumulated near a rotating primordial black hole, as a result of superradiative instability, is estimated to be very high due to Hawking's electromagnetic radiation [7].

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