

SPECTRUM OF SUBRELATIVISTIC COSMIC RAYS AND HARD X-RAY ORIGIN

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We investigate the origin of the nonthermal X-ray emission from the Galactic ridge. We consider bremsstrahlung of cosmic rays as a production process. From the solution of the kinetic equations describing particle acceleration from the thermal pool we estimated parameters of acceleration processes, the chemical composition of the accelerated flux etc. We have shown that spectrum of the emitting particles should be very hard in order to reproduce the observational data. This type of spectra are expected for processes of in-situ acceleration.

In the case of proton bremsstrahlung origin of the X-ray emission the maximum energy of the protons is of the order of several hundreds of MeV. Big problems for the proton bremsstrahlung model are the high gamma-ray flux generated by the protons and their high pressure in the Galactic disk.

For the electron origin of the ridge flux we do not have these problems. But in this case we must assume that acceleration of protons is suppressed. We discuss the possible origin of this effect. This analysis covers the gap between nonthermal gamma-ray emission and the thermal soft X-rays and thus gives ideas about connections between processes in the background plasma and acceleration of nonthermal particles.