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COSMIC RAY CONFINEMENT IN THE GALAXY AND THE INTERSTELLAR SPECTRUM OF HYDROMAGNETIC WAVES

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Abstract

We present a discussion of the possibility that cosmic rays diffuse in the galaxy because of their resonant interactions with a spectrum of hydromagnetic waves. We show that, even under the most favorable assumptions for the energy transfer between waves, it is not possible that the neutral portions of the interstellar medium could contain enough wave energy to trap the cosmic rays; however, the dissipation of hydromagnetic waves could be an important source of heat for the interstellar medium.

Recent ultraviolet and soft X-ray observations in the solar neighborhood (Jenkins and Meloy, 1974) revealed the existence of a hot (10^6°K) and dilute phase in the interstellar medium. We show that, if such a phase filled a large percentage of the volume of the galactic disk, it would have an important effect on the over all picture of galactic cosmic ray diffusion.

E. B. Jenkins and D. A. Meloy, 1974, preprint.

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