

THERMOCHEMICAL INSTABILITIES IN REACTING GASES.
II. PLASMA OF HYDROGEN IN PRESENCE OF A MAGNETIC
FIELD

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ABSTRACT. The thermochemical criteria for instability in reacting gases, studied by Ibáñez and Parravano (1983), are generalized to include the presence of a magnetic field. The growth rates, the critical wavelengths and the amplitudes of the resulting unstable modes are determined as a function of the angle θ (angle between the directions of the magnetic field and the wave number of the perturbation k) and the ratio: Alfvén velocity/isentropic sound velocity.

The generalized criteria for instability are applied to a pure hydrogen plasma model, heated at a constant rate but cooled by recombinations, excitations, and ionizations by collisions, and free-free transitions. The radiative transfer effects are taken into account by OSA approximation. The relevance of the above instabilities as generators of cosmical objects in the primordial plasma, in particular behind pregalactic shock waves, is analysed. Others astrophysical implications are also examined. (1985, Ap. J. Submitted)

REFERENCES

Ibáñez, S.M.H. and Parravano, A., 1983, Ap. J., 275, 181.

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