

STUDIES OF GALAXIES IN THE OH 18-CM LINES

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Megamaser emission of galaxies in the OH main lines 1665 and 1667 MHz /see, e.g., Baan, 1989/ is analysed. A semi-analytical time-dependent solution is obtained of a system of differential equations which includes the radiative transfer equation and the equation for population difference of the maser levels. The system was solved by the Euler's method. Various cases of solution perturbations, caused by time variability of the central radio continuum source are considered.

Anomalies of OH satellite lines 1612 and 1720 MHz in some galaxies are also discussed. At least in two galaxies anomalies of satellites' intensities are observed - in NGC 4945 /Whiteoak and Gardner, 1975/ and in NGC 253 /Gardner and Whiteoak, 1975/. In both galaxies, the anomalous ratio of the satellites' intensities is changing progressively with radial velocity. This is consistent with the model of spin alignment of OH molecules by far-IR radiation of the central source in an external magnetic field; this model was developed in detail in application to interstellar clouds by Burdyuzha and Varshalovich /1972/. Anomalies observed in OH satellites in other galaxies, as well as in the central part of our own Galaxy /Whiteoak and Gardner, 1976/, indicate that this model can also explain similar phenomena on galactic scales.

References

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