ON THE STRUCTURE OF A QUASIOPTICAL WAVE BEAM REFLECTED FROM THE O-X TRANSFORMATION REGION [[1]](#footnote-1)\*)

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The linear transformation of normal waves in a magnetised plasma has recently been actively studied in connection with the problems of microwave heating and diagnostics of plasma with a density above the critical one in magnetic traps of various configurations [1–3]. The key task of the research was to determine the efficiency of transformation of a quasi-optical wave beam introduced into the plasma and to search for the conditions under which such transformation is most efficient. However, during numerical simulation, attention was also paid to interesting properties of the reflected beam, in particular, to the formation of transformation of weakly diffracting beams with an intensity dip on the beam axis upon reflection from the O–X region [4–6].

In this work, the structure of a quasi-optical wave beam reflected from the O–X transformation region was analytically studied. It was shown that upon reflection from the transformation region, the beam acquires a nonzero angular momentum, and this is associated with the formation of a zero point of the vortex near the axis of the reflected wave beam (a point with an indefinite phase and, as a result, a zero amplitude value). The discussed effect can be useful for fine beam aiming and magnetic field diagnostics in the region of linear interaction of O and X waves.

References

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