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**On the paraxial approximation of the stationary Vlasov-Maxwell system.** (English)

[Zbl 0787.35110](#)

[Math. Models Methods Appl. Sci.](#) 3, No. 4, 513-562 (1993).

The paper deals with the study of the paraxial model of approximation of the Vlasov-Maxwell equations which is widely used to analyze the confinement of beams. One first introduces scaling for the nonrelativistic stationary dimensionless Vlasov equation, and then an asymptotic expansion of its solution is derived. The paraxial model is obtained by retaining only those equations which provide the determination of transverse components from longitudinal components (loosely speaking). The axisymmetric case is considered with pure external fields on the one hand, and self-consistent fields on the other hand. Finally one deals with the three-dimensional case, an application to beam emittance is considered.

Reviewer: [G.Jumarie](#) (Montreal)

**MSC:**

[35Q60](#) PDEs in connection with optics and electromagnetic theory

[35B20](#) Perturbations in context of PDEs

[35C10](#) Series solutions to PDEs

[78A25](#) Electromagnetic theory, general

Cited in **11** Documents

**Keywords:**

small parameter; perturbation; Vlasov-Maxwell equations; beams; nonrelativistic stationary dimensionless Vlasov equation; asymptotic expansion

**Full Text:** [DOI](#)