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## Electron Cyclotron Waves in Fusion Plasmas (Basic Theory and Applications)

In fusion plasmas, waves with frequencies in the electron cyclotron (EC) range are employed for heating and current drive as well as for diagnostic purposes.

The theoretical approach to the propagation and absorption of EC waves is based on a kinetic treatment of the interaction between waves and plasma.

Goal of this lecture is to review the basic steps leading from the fundamental equations to the tools commonly employed to describe EC waves under realistic (reactor relevant) conditions.

The first part of this lecture will introduce the fundamentals of plasma electrodynamics and kinetics, as needed to derive the basic energy relations and the hot-plasma dielectric tensor.

In the second part, some examples of the practical implementation of the concepts derived above are discussed. Typical applications of EC waves in weakly inhomogeneous plasmas are described and some open problems are highlighted.