# On finite collisionality effects in ECCD

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The adjoint technique based on solving the generalised Spitzer problem is a standard tool for calculatiing of ECCD efficiency by means of ray- and beam-tracing codes. The key point is the choice of model for the corresponding Spitzer function, which should include the relevant effects, in particular parallel momentum conservation and finite collisionality. Both the highly collisional and the low-collisionality limits are well studied and the latter, which accounts for trapped particles, is commonly adopted for hot plasmas.

The intermediate collisionality regime, where the contribution of barely trapped electrons can also be non-negligible, requires special attention since the problem is formally 4D in stellarators and 3D in tokamaks. In this work, we consider the generalised Spitzer problem in view of developing tools for the calculation of ECCD efficiency suitable for implementation in ray-tracing codes. A phenomenological "off-set" model based on the momentum-correction technique [1], which can at the moment constitues the most rapid and sufficiently accurate tool, was applied and benchmarked against the code NEO-2 [2], which is more precise but at present limited to treating axisymmetric plasmas.

[1] H. Maaßberg *at al.*, Phys. Plasmas **16**, 072504 (2009).
[2] W. Kernbichler *at al.*, Plasma and Fusion Research **3**, S1061 (2008).