

# Beam Transmission in ITER Injectors with Account of Possible Beam Parameters Deviations from Nominal Conditions

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Transmission of the powerful atomic beam to the ITER plasma is one of the key issues of the injector design: it defines part of the negative ion beam power at the exit from the beam source delivered as atomic beam into ITER plasma, the rest part of the accelerated beam creates power loads onto beam line components. During EDA phase of the ITER design the beam transmission has been studied and the range of basic parameters have been defined to provide required power delivery to ITER [1] within given geometry of the beam line and within acceptable level of intercepted power and power density loads. So the following beam parameters have been established: the range of the beam divergence ( $3\div 7$  mrad), maximum acceptable beam misalignment in horizontal ( $\pm 2$  mrad) and vertical ( $\pm 4$  mrad) directions. In the suggested paper a number of additional realistic parameters influencing the beam transmission are introduced into the study. It includes parameters having statistical character of beamlet deviations (as an example, individual beamlet misalignment and variation of beamlet divergence due to existing tolerances during grids manufacturing and assembling) and also deviations, defined by physical reasons (as plasma un-homogeneity in vicinity of the plasma grid, thermal expansion of grids in the beam source, etc.). The list of reasons for beam deviation and relevant coefficients values in deviation formulas has been studied. On this base a sensitivity analysis of beam transmission has been performed.

## Reference

[1] ITER DDD5.3, [http://132.169.11.26/iter-doc/ddd/ddd53/ddd53\\_index.html](http://132.169.11.26/iter-doc/ddd/ddd53/ddd53_index.html).

## Topic:

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