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Experimentally motivated saturation rule for the TGLF turbulent transport model[1] STERLING SMITH, General Atomics, MICHELE FASCIANA, Politecnico di Torino, ORSO MENEGHINI, GARY STAEBLER, General Atomics — The TGLF ion and electron heat fluxes have been evaluated for 50,000 points of unique shot/time/radius of DIII-D experiments. The database was compiled without regard to discharge geometry (limited, diverted) or operating mode (L- or H- mode) for normalized rho (toroidal flux) radii=0.1,0.2,...,0.9 and for times=2000,2100,...,2800 ms. There is general agreement with the inferred power balance fluxes for the original (SAT_RULE=0) saturation rule of TGLF. A newer saturation rule (SAT_RULE=1) was introduced to better account for multiscale coupling in wavenumber space, but this rule does not compare as favorably to the experimentally inferred database as the original saturation rule. The agreement between experimental and TGLF fluxes can be improved by using a saturation intensity of the form $V = (a + b\log(k))/k^c$, where a, b, c depend on the input parameters for TGLF (electron or ion temperature scale length, etc.) but not explicitly on the growth rates or wavenumbers. This analytic form of intensity was devised by observing the form of the intensity obtained by training a neural network (NN) that would yield intensities such that the TGLF fluxes would match the experimentally inferred fluxes.

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