# STRAHL modelling of impurity transport on Wendelstein 7-X during first divertor campaign

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In the first divertor operational phase (OP 1.2A) of Wendelstein 7-X, impurity transport experiments were performed with non-recycling materials via laser blow-off injection (LBO) [1]. The x-ray imaging spectrometer systems, HR-XIS [2,3] and XICS [4], were used to measure He-like spectra from the injected impurities in steady-state Helium discharges at various input ECRH heating powers and plasma densities. For these particular experiments the spatial and temporal emissivities from the mid-Z materials of either Titanium or Iron were measured, allowing for the estimation of the diffusion and convective velocity parameters for the respective measured charge state [5].

Utilizing the 1D transport code STRAHL [6], the spatial and temporal evolution of each impurity ionization charge state is modelled for assumed anomalous diffusion and convective velocity profiles. To match the experimentally measured emissivities, a chi-squared minimization is done on the experimental data by varying the input anomalous diffusion and convective velocity parameters for STRAHL. In addition a Gaussian process regression (GPR) [7] is used to improve and to better propagate the uncertainty estimates from the input electron temperature and density profiles in STRAHL to the modelled output diffusion and convective velocity parameters.

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