Reduced Model for Gyrokinetic Turbulent Transport in Helical Plasmas

▸ Gyrokinetic simulations in stellarators are extremely heavy.

➡️ **Reduced model**

$$\frac{\chi_{\mathrm{i}}^{\mathbf{model}}}{\chi_{\mathrm{i}}^{\mathbf{GB}}} = \frac{A_1 \left(\sum_k \tilde{\gamma}_k / \tilde{k}_y^2 \right)^{\alpha}}{A_2 + \tilde{\tau}_{\mathrm{ZF}} / \left(\sum_k \tilde{\gamma}_k / \tilde{k}_y^2 \right)^{1/2}}$$

▸ Based on the correlations between nonlinear and linear GK simulations

▸ The model can reproduce nonlinear GK simulation results

▸ Calculation cost is extremely smaller than nonlinear simulation (less than 5%)