Keep-in-Touch VIP meeting
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Modelling the vibrational kinetics of CO_2 through the Fokker-Planck approach

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Low-temperature plasmas allow to convert greenhouse CO_2 into new carbon-neutral fuels or useful chemicals with high energy efficiency. In order to understand and optimize these systems, reactor models that also take into account vibrational non-equilibrium have to be developed. However, the calculation of the vibrational distribution function (VDF) through the usual state-to-state (STS) approach compromises the computational efficiency of multidimensional models. In this presentation, a new approach is presented, more computationally efficient than the STS method, to calculate the VDF of the asymmetric stretching mode of CO_2, based on the drift-diffusion Fokker-Planck (FP) equation. It is shown that the FP approach to vibrational kinetics can be self-consistently used in plasma models and the validation of this method is discussed, by comparing VDFs calculated through FP and STS simulations.