SFB/TRR 21 - Seminar

7. Mai 2012, Ulm

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Universal reaction rates for ultracold molecular collisions

I will discuss a simple model of reactive collisions based on the quantum defect method. The model is characterized by two dimensionless quantum defect parameters: y and s. The former describes probability of reaction, and the latter gives the phase of the wave function at short range. For y close to unity we obtain universal collision rates determined only by the quantum transmission of the long range potential. At y small the collision rates are not universal and exhibit resonances dependent on the particular form of the long-range interaction and the confining potential. In case of van der Waals interactions, the quantum defect model predicts simple analytic expressions for s-wave and p-wave collision rates. In the universal limit the analytical rate constants agree very well with the experimental rate constants for reactive collisions of KRb + KRb and K + KRb.

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