## Collisions of universal and non-universal polar molecules in quasi-2d traps

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## Abstract

We investigate collisions of polar molecules in quasi-2d configuration in the presence of external electric field perpendicular to the collision plane [1]. Our 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 reflection process from the long-range potential, and dependent only on the van der Waals coefficient, dipole-dipole interaction and the trap frequency. At small reaction probabilities the collision rates are not universal and exhibit resonances induced by the confining potential. At high dipole moments we observe the suppression of reactive collisions that can stabilize the ultracold gas of polar molecules. The calculations are done by propagating multichannel wavefunction in the spherical basis and then transforming to the cylindrical coordinates at large distances. In this way we can describe collisions of highly polar molecules, e.g. LiCs, NaCs. Successful experimental production of ultracold molecules [2, 3] provides an opportunity for testing presented calculations.



Figure 1: Ultracold polar molecules in quasi-2d trap with applied electric field. Source: http://www.physik.uni-stuttgart.de/TR21/en/projects.php/B/

## References

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