

## New physics with ultracold strontium molecules

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State-of-the-art *ab initio* methods of quantum chemistry have found numerous applications in many areas of atomic, molecular, condensed matter, and nuclear physics. During the last decade they have been applied with success to interpret precision experiments on two-body and many-body processes in atomic gases in the ultracold regime. In this talk I will present recent examples of successful applications of the *ab initio* methods to describe two-body processes in atomic optical lattices leading to the formation of unusual chemical bonds, to observations of exotic optical transitions in diatomic molecules [1-3], and to photodissociation processes with the full quantum state control [4-7]. All reported theoretical results will be illustrated by an extensive comparison between theory and experiment.

### References

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