

Cold Polyatomic Molecules: The New Frontier

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Polyatomic molecules with their many degrees of freedom and their permanent electric dipole moment offer new perspectives for the exploration of fundamental physics and chemistry as well as for the implementation of novel ideas, e.g., in quantum information science. Reaching such goals requires the development of generally applicable and sufficiently simple molecular control techniques including slowing, trapping and cooling, as well as accumulation. The talk will highlight some recent achievements in this direction including the deceleration of molecules with a spinning centrifuge [1], their accumulation and trapping in tailor-made electrostatic fields [2], and their cooling via a Sisyphus effect which employs radio-frequency and microwave transitions between rotational states to decrease energy and spontaneous transitions between vibrational states to remove entropy [3].

References

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