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【562】 Quantum-Logic Assisted Molecular Precision Measurements Using a Network for The Distribution of The Swiss Frequency Standard

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The application of quantum-logic techniques to the spectroscopy of trapped molecular ions has enabled the determination of molecular properties at unprecedented levels of precision. Molecules have been proposed as suitable candidates for testing possible time-variation of fundamental constants and precision testing of QED. Further advancement in the measurement accuracy will be enabled through the implementation of network for the distribution of the Swiss frequency standard. We are currently establishing a complete toolbox for high-precision spectroscopy of single molecules using quantum-logic methods, their initialization, coherent manipulation and non-destructive interrogation by coupling them to a co-trapped single atomic ion. We have laid the experimental and theoretical foundations for hyperfine-state initialization of the molecular ions and addressing the suitable extremely narrow infrared transitions.

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