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Type: **Invited Speaker**

A general method for single molecule infrared spectroscopy

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We demonstrate a novel single molecule action-spectroscopy technique that is compatible with high precision measurement. The method is generally applicable to a wide range of polyatomic molecular ions, and promises spectral resolution comparable to state of the art quantum logic methods, with significantly less stringent experimental overhead. The method is an extension of the recent ensemble “Leak Out Spectroscopy” work in the Schlemmer group, extended to single molecular ions and laser-cooled samples. Our recent single-molecule tagging spectroscopy results will also be presented. Progress towards extending this technique to include chiral recognition of single molecules will be discussed. Adaptations of this technique will prove useful in a wide range of precision spectroscopy arenas, including the search for parity violating effects in chiral molecules.

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