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Coherence time in the JILA eEDM measurement using trapped molecular ions KEVIN COSSEL, WILL CAIRNCROSS, MATT GRAU, DAN GRESH, JUN YE, ERIC CORNELL, JILA/University of Colorado-Boulder — Trapped molecular ions provide several significant potential advantages in precision measurement experiments due to the ease with which they can be trapped and the long coherence time possible in ground or metastable states. Current precision measurement experiments using ions, such as atomic clocks, typically use a single ion, which limits the signal-to-noise possible. In some cases, it would be beneficial to work with an ensemble of ions to improve the count rate, but ion-ion interactions may also lead to potential sources of systematic errors or decoherence. For example, we have recently demonstrated the feasibility of a measurement of the electric dipole moment of the electron using a collection of trapped HfF^+, with a coherence time of 100ms. Here we discuss the effects limiting this coherence time.

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