

Abstract Submitted  
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**Three dimensional imaging technique suitable for the measurements of the internal energies of asymmetrical diatomic molecular ions<sup>1</sup>**  
J.B. SAUZA, D.I. PANCHENKO, A.C. DUOT, R.A. STROM, V.M. ANDRIANARIJAONA, Department of Physics, Pacific Union College, Angwin, California 94508, USA — We propose a three dimensional imaging technique that could be used to measure the internal energy of asymmetrical diatomic molecular ions such as  $\text{HeH}^+$  and  $\text{CO}^+$ . The detection scheme is similar to the one used for symmetrical diatomic molecular ions, which accesses the internal energy of the ion through the kinetic energy release in a resonant dissociative charge transfer (see for instance Phys. Rev. Lett. **92** 163004 (2004)). In that technique, the fragments hit two detectors which send the positions of the impacts along with the difference between the times of impacts to a computer. The computed kinetic energy release is related to the vibrational excitation level of the initial molecular ion. In the case of an asymmetrical ion, the lighter fragment has a higher recoil velocity and goes further away transversally from the center of mass direction. The heavier fragment would not hit the first detector if the beam is judiciously misaligned. Therefore, we make distinction between the two particles. Details of the technique will be presented.

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