Sequential three-body breakup of a CO$_2^+$ beam$^1$ JYOTI RAJPUT, U. ABLIKIM, M. ZOHRABI, BETHANY JOCHIM, BEN BERRY, K. D. CARNES, B. D. ESRY, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506, USA — The dissociative double ionization of a CO$_2^+$ beam leading to the three-body fragmentation channel C$^+$ + O$^+$ + O$^+$ can have its origin in either a sequential or concerted process. In case of the sequential mechanism, the first step is a two-body breakup into CO$_2^{2+}$ + O$^+$, followed by a second step wherein CO$_2^{2+}$ further fragments into C$^+$ + O$^+$. The rotation of the CO$_2^{2+}$ formed during the first step [1] has been used to discriminate between the sequential and non-sequential mechanisms in experiments which employ multi-coincidence momentum imaging techniques for detecting recoil fragments [2,3]. We propose a novel way to look at this discriminating feature in terms of the angle of rotation of the CO$_2^{2+}$ intermediate. We will also discuss the implications on the measured momentum distribution of detecting indistinguishable fragments in a coincidence measurement. [1] E. Krishnakumar et al., Phys. Rev. A 44, R4098 (1991). [2] N. Neumann et al., Phys. Rev. Lett. 104, 103201 (2010). [3] C. Wu et al., Phys. Rev. Lett. 110, 103601 (2013).

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