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Imaging the spatial many-body wave functions of $\mathbf{H}_3$[1] PEER CORNELIS FECHNER, HANSPETER HELM, Albert-Ludwigs-University Freiburg — We study state-selected H_3 molecules which predissociate into the $H(1s)+H(1s)+H(1s)$ channel of the repulsive ground state. The correlated fragment momentum vectors in lab-frame are recorded in triple coincidence and transformed to center-of-mass momenta. Accumulating $\sim 10^4$ such events yields a probability map of momentum configurations, equivalent to the modulus square of the momentum wave function long after the decay. Recently theory was successful in predicting several details of the maps observed. Here, we present a model which well explains the dominant features of momentum maps in terms of spatial symmetries in the direct product of initial bound-state wave function and the non-adiabatic coupling term which initiates dissociation. Excellent agreement is found between measured asymptotic modulus squared wave function in momentum space and modelled initial modulus squared wave function in position space [P. C. Fechner, H. Helm, Phys. Chem. Chem. Phys., 2014, 16, 453]. On this basis we discuss in general the equivalence of a complete characterization of linear momenta of fragments from a many-body fragmentation process and the many-body spatial wave function, a concept introduced by J. H. Macek as *imaging theorem*.

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