

Abstract Submitted
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Vortices in (e,2e) momentum distributions¹ J.H. MACEK, University of Tennessee and ORNL, S.Y. OVCHINNIKOV, J.B. STERNBERG — Complete experiments measure all variables associated with atomic processes. Momentum distributions of ejected electrons in pure states, as for (e,2e) measurements, are examples of such complete experiments. All structures seen in such distributions are listed by Briggs and co-workers² in 1994. Recently, we pointed out that there is a type of structure not included in the list. It has been shown that momentum distributions image time-dependent wave functions, and such wave functions may contain vortices owing to angular momentum transfer between species involved in the dynamical processes. The vortices are associated with exact zeros at single, isolated points. We have found such zeros in calculated momentum distributions for ion-atom collisions, photoionization, and (e,2e) distributions. By mapping distributions that image time-dependent wave functions we find velocity fields that circulate about exact zeros confirming their vortex structure. The vortices appear as unexpected holes in the (e,2e) momentum distributions. Our calculations suggest that one particular vortex has been observed.³

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²J. Berakdar and J. S. Briggs, *J. Phys. B*, **27**, 4271 (1994).

³A. J. Murray and F. H. Read, *Phys. Rev. A*, **47**, 3724 (1993).

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