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**Near-threshold photodetachment in parallel electric and magnetic fields** CHRISTIAN BRACHER, JOHN DELOS, College of William & Mary — We predict photodetachment cross sections and spatial photoelectron distributions in parallel electric and magnetic fields. Near-threshold photodetachment cross-sections of negative ions in strong external electric fields show oscillations related to interference of outgoing with returning electron waves. The interference pattern can also be imaged on a position-sensitive detector, and these observed interference patterns permit the determination of electron affinities with unprecedented accuracy. If a magnetic field is added parallel to the electric field, the spiraling motion of the electron produces trajectories with interesting caustic structures. Multiple paths connect the source to any point on the detector, so a complex interference pattern is found. Using semiclassical methods, we predict the structure of this interference pattern, and we show how it evolves as the electron energy and the field strengths change.

Christian Bracher
College of William & Mary

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