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Continuous variable quantum state tomography of photoelectrons

We have developed a continuous variable quantum state tomography protocol for photoelectrons that are ionised by the absorption of extreme ultraviolet (XUV) light pulses. Through numerical simulations we demonstrate our result in the vicinity of the 2s2p and 3s^{-1}4p Fano resonances in helium and argon. In the case of argon we are able to quantify the ion-photoelectron entanglement due to the spin-orbit splitting through the measurement of the purity of the photoelectron and show how the entanglement varies as function of the XUV bandwidth.

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