

## INTERFERENCE BETWEEN AUGER AND PHOTO ELECTRONS IN DOUBLE PHOTOIONIZATION PATTERNS

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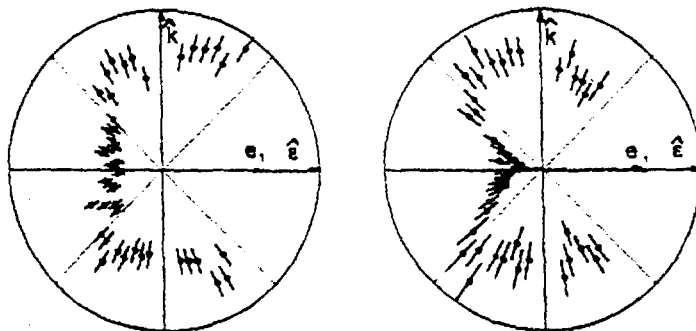
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Recent experiments on direct double photoionization of helium <sup>1,2</sup> as well as other rare gases <sup>3,4</sup> have shown that anti-parallel emission of the two electrons is forbidden, when these electrons have equal energies and when they are produced in "symmetry unfavoured" states. This is the case for helium, which leads to the <sup>1</sup>P<sup>o</sup> symmetry for the pair of electrons, but also for the RG<sup>++</sup>...np<sup>4</sup> <sup>1</sup>D<sup>o</sup> and <sup>1</sup>S<sup>o</sup> final states of doubly charged rare gases which lead to the (<sup>1</sup>P<sup>o</sup>, <sup>1</sup>D<sup>o</sup>, <sup>1</sup>F<sup>o</sup>) and <sup>1</sup>P<sup>o</sup> symmetries respectively.

For rare gases other than helium indirect double photoionization through autoionization of an intermediate singly charged ion can also occur. It must *a-priori* satisfy the same interdiction of anti-parallel emission, which only depends on the symmetry of the residual doubly charged ion. A recent detailed analysis <sup>5</sup> confirms this but shows that the experimental observation is more difficult, as it requires energy resolutions better than  $\Gamma$  (the width of the intermediate singly charged state).

We shall present recent measurements in which such conditions have been achieved, for a Ne<sup>+</sup> <sup>2</sup>S state with  $\Gamma \approx 150$  meV and for the Ne<sup>++</sup>...2p<sup>4</sup> <sup>1</sup>D<sup>o</sup> final state. As an illustration the following figure shows the full TDCS patterns obtained with poor resolutions (left part) and high resolutions (right part). The interdiction of anti-parallel emission when the photo and valence Auger electrons have exactly the same energy, which can be seen as an interference effect, is clearly confirmed by the near node visible on the right hand side pattern. These results will be discussed in detail and compared with calculations based on expressions given by Vegh and Macek <sup>5</sup>.



Indirect double photoionization in neon, with poor (left) and high (right) resolutions

### References.

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