

YOUNG ELECTRON INTERFERENCE EFFECTS IN ATOMIC IONIZATION COLLISIONS

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Even though the concept of interference was already implicit in Newton's 1688 explanation of the anomaly of the tides in the Gulf of Tongkin, it was Thomas Young in his Bakerian Lectures of 1801 who generalized this idea and applied it to a variety of situations. His celebrated double-slit experiment, first described in his *Course of Lectures on Natural Philosophy and the Mechanical Arts* of 1807, has been regarded as a prime demonstration of the wave-nature of light and, in its single electron interference version, was recently voted as the most beautiful experiments in Physics [1]. Since the foundational times of Modern Physics, the appearance of electron interference effects in different atomic processes has never failed to attract considerable attention. A recent wave of interest was triggered by the observation made by Stolterfoht et al. [2] of interference effects in the ionization of hydrogen molecules by energetic ion impact. Unlike electron diffraction experiments by matter, in ionization processes the electrons are not coming from a distant source, but from one of the two partners in the collision event. In this communication we review different interference mechanisms that occur in ionization collisions. In particular, by means of a Multiple-Scattering Theory we discuss the occurrence of re-scattering of the emitted electron by different centers. Finally, we propose a direct atomic realization of a Young interference experiment, where a single electron source and a two-center scatterer are prepared in each collision event [3].

References

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