

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Convolutd Quasi Sturmian basis for the two-electron continuum.

LORENZO UGO ANCARANI, Universite de Lorraine, A S ZAYTSEV, S A ZAYTSEV, Pacific National University, Khabarovsk, Russia — In the construction of solutions for the Coulomb three-body scattering problem one encounters a series of mathematical and numerical difficulties, one of which are the cumbersome boundary conditions the wave function should obey. We propose to describe a Coulomb three-body system continuum with a set of two-particle functions, named Convolutd Quasi Sturmian (CQS) in [1]. They are built using recently introduced Quasi Sturmian (QS) functions [2] which have the merit of possessing a closed form. Unlike a simple product of two one-particle functions, by construction, the CQS functions look asymptotically like a six-dimensional outgoing spherical wave. The proposed CQS basis is tested through the study of the double ionization of helium by high-energy electron impact in the framework of the Temkin-Poet model [3]. An adequate logarithmic-like phase factor is further included in order to take into account the Coulomb interelectronic interaction and formally build the correct asymptotic behavior when all interparticle distances are large. With such a phase-factor (that can be easily extended to take into account higher partial waves) rapid convergence of the expansion can be obtained. [1] Zaytsev A S, Ancarani L U and Zaytsev S A (2016) Eur. Phys. J. Plus 131, 48. [2] Del Punta J A et al (2014) J. Math. Phys. 55, 052101. [3] Gasaneo G et al (2013) Phys. Rev. A 87, 042707.

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Date submitted: 03 Jun 2016

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