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Convergence and Momentum Dependence of the Correlation Correction to the Amplitude of Positron Annihilation on Atoms GLEB GRIBAKIN, Queen's University Belfast, UK, BRENDAN MCGRATH — Positron annihilation rates in solids and in gases are strongly affected by electron-positron correlations. Observed rates exceed those evaluated in the independent-particle approximation many times. In solids this effect is usually taken into account through an enhancement factor (EF), which depends on the electron density [1]. Correlations also affect the momentum distribution of the annihilating electron-positron pairs, which determines the shape of the annihilation gamma spectrum. This effect is beyond the EF approximation and is often neglected [1]. Using a many-body theory framework [2] we analyse the convergence of the 1st-order correction to the annihilation amplitude with the orbital angular momentum l of the intermediate electron and positron states. We find that these contributions converge as $(l + 1/2)^{-2}$, and have a distinctly different momentum dependence compared with the 0th-order amplitude, narrowing the annihilation spectra.

1. M. Alatalo et al., Phys. Rev. B **54**, 2397 (1996).
2. G. F. Gribakin and J. Ludlow, J. Phys. B **35**, 339 (2002); L. Dunlop and G. F. Gribakin, *ibid.* **39**, 1647 (2006).

Gleb Gribakin
Queen's University Belfast, UK

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