

# Angular correlation and genuine- and conjugate-Fermi holes in two-electron atomic systems

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**Abstract.** The ground and low-lying singly-excited states of He and He-like atomic ions have been studied by the full configuration method focusing on the angular correlation between the two electrons in the studied systems. The two-electron angle density distributions show distinct trends between the ground and excited states and between the singlet-triplet pair of states for different nuclear charge  $Z_n$ . The probability density distribution of the ground state has a strong dependence on the two-electron angle  $\phi$  for small values of  $Z_n$ , such as  $Z_n = 2$  and 3, which diminishes to zero as  $Z_n$  increases towards infinite. On the other hand, the probability density distributions of the singlet-triplet pair of states of the (1s)(2p) configuration show a very weak dependence on  $\phi$  for the small values of  $Z_n$  but a strong dependence for increasing  $Z_n$ , that represents peaks at  $\phi = 0, \pm\pi$  and  $\pm\pi/2$  for the singlet and triplet states, respectively. The origin of these angular dependences is rationalized on the basis of the structure of the genuine and conjugate Fermi holes.

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