

**A probabilistic proof of the fundamental gap conjecture via the coupling by reflection**

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*Abstract.* Let  $\Omega \subset \mathbb{R}^n$  be a strictly convex domain with smooth boundary and diameter  $D$ . The fundamental gap conjecture claims that if  $V: \bar{\Omega} \rightarrow \mathbb{R}$  is convex, then the spectral gap of the Schrödinger operator  $-\Delta + V$  with Dirichlet boundary condition is no less than  $3\pi^2/D^2$ . Recently this conjecture was proved by Andrews and Clutterbuck in [J. Amer. Math. Soc. 24 (2011), no. 3, 899–916] using analytic methods. In this talk we shall give a probabilistic proof via the coupling by reflection of the diffusion processes. This is a joint work with Fuzhou Gong and Huaqian Li.