**Enhancing Rydberg Blockade Radii via Electric Field Modulation of Förster Resonance**

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The van der Waals (vdW) and dipole-dipole interactions among Rydberg atoms are key to the longdistance blockade effect. Förster resonance can enhance vdW interactions. We study 87Rb-87Rb Rydberg states and calculate the energy defect between initial and final pair states. Our theoretical analysis examines the radial wave functions and energy defects affecting the vdW coefficient, C6. With larger differences in principal quantum numbers, we observe a significant increase in vdW interactions, achieving a Rydberg blockade radius over 50 μm. Experimentally, we use high-contrast Rydberg-EIT spectroscopy and apply external fields based on the Stark effect to amplify interaction strength through Förster resonance.