

Abstract Submitted
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Control of multiple excited Rydberg states around segmented carbon nanotubes PETER SCHMELCHER, Center for Optical Quantum Technologies, Luruper Chaussee 149, University of Hamburg, 22761 Hamburg, HOSSEIN SADEGHPOUR, ITAMP, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA, JOHANNES KNOERZER, CHRISTIAN FEY, Center for Optical Quantum Technologies, Luruper Chaussee 149, University of Hamburg, 22761 Hamburg — Electronic image Rydberg states around segmented carbon nanotubes can be confined and shaped along the nanotube axis by engineering the image potential. We show how several such image states can be prepared simultaneously along the same nanotube. The inter-electronic distance can be controlled a priori by engineering tubes of specific geometries. High sensitivity to external electric and magnetic fields can be exploited to manipulate these states and their mutual long-range interactions. These building blocks provide access to a new kind of tailored long-range interacting quantum systems.

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