Abstract Submitted
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Exotic dipole traps for ^{23}Na^{40}K molecules ANDREAS SCHINDEWOLF, ROMAN BAUSE, Max Planck Institute of Quantum Optics and Munich Center for Quantum Science and Technology, MING LI, Department of Physics, Temple University, XING-YAN CHEN, MARCEL DUDA, Max Planck Institute of Quantum Optics and Munich Center for Quantum Science and Technology, SVETLANA KOTOCHIGOVA, Department of Physics, Temple University, IMMANUEL BLOCH[1], XIN-YU LUO, Max Planck Institute of Quantum Optics and Munich Center for Quantum Science and Technology — Mixing rotational states of dipolar molecules is essential to utilize their dipolar interaction and to simulate spin systems. We use a rotational-state-sensitive electronic transition to create a highly-tunable optical dipole trap for NaK molecules. By tuning the trapping light over a range of 10 GHz we can switch between a 'magic' and two 'tune-out' conditions for the states $|v = 0, J = 0\rangle$ and $|v = 0, J = 1\rangle$, while maintaining molecule lifetimes of about 1 s or longer [1]. Here, v is the vibrational and J the rotational quantum number of the electronic ground state. The transition can be used to achieve long coherence times in superpositions of rotational states and to realize novel cooling schemes in optical lattices. [1] R. Bause et al., arXiv:1912.10452.

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