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Towards arrays of strontium atoms in optical tweezers. JACOB COVEY, ALEXANDRE COOPER, IVAYLO MADJAROV, BRIAN TIMAR, EMILY QIU, ALEXANDER BAUMGRTNER, MANUEL ENDRES, Caltech — Cold atoms in optical tweezer arrays have emerged as a versatile platform for quantum simulation and quantum computing. Recent work has demonstrated approaches to cooling atoms close to their motional ground state and to assembling atoms into large, defect-free arrays. We extend the work done on alkali atoms to strontium, where the cooling is done on the narrow intercombination transition, thus providing a unique setting where motional states are directly resolved. In this talk, we will describe our protocol for loading strontium atoms into tweezers near a green magic wavelength and for detecting them on the broad singlet transition while cooling on the intercombination line. We will then describe our strategy for exciting atoms to S-Rydberg states via a single photon transition from the optical clock state, providing a novel avenue for controlling coherent long-range interactions and investigating quantum many-body dynamics.

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