Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Characterization of ultracold 88Sr atoms for the dipolar interaction of the 3P0-3D1 transition SHENGNAN ZHANG, PREETAM RAMCHURN, YESHPAL SINGH, KAI BONGS, University of Birmingham — Recently, a novel idea on the long-range dipolar interactions on the 3P0 - 3D1 transition at 2.6 m for bosonic strontium (Sr) atoms has been proposed. The challenge for experimentally achieving the dipolar interaction is the preparation of dense and ultracold samples. In this paper we demonstrate the experimental facility of preparing dense and ultracold 88Sr atoms and characterize them. The unique points of the facility are self - assembled Zeeman slower based on the permanent magnets and the repumping mechanism with 3P0 - 3D1. The combination of the high slowing efficiency slower and the 707 nm/2.6 m repumping enables to prepare 1 billion cold 88Sr atoms in the blue MOT. The high vacuum ¡ $1 * 10^{-}11 mBar$ makes the lifetime of blue MOT more than 1 s. In the single frequency red MOT, the atom number can reach more than 100 million. The magnetic trap of 3P2 has a lifetime of 1.1 s and loading time of 0.3 s. The facility can be applied to other isotopes. The atoms will be loaded from the single frequency red MOT to 3D optical lattice at the magic wavelength of 412.8 nm. Once the atoms are trapped in the lattice, the experiment of dipolar interactions will be implemented.

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Date submitted: 04 May 2020 Electronic form version 1.4