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Dark matter and gravitational waves help us form a complete description of our understanding of the universe. However, specific subclasses remain elusive for current detectors. The Atom Interferometry Observatory and Network (AION), a consortium of UK institutes, aims to use atom interferometry in strontium to detect them. The sensitivity window of AION probes the millihertz regime where detection gaps currently exist, revealing crucial information about mid-frequency gravitational waves and ultra-light dark matter. To achieve high-fidelity atom-optics interactions, AION would therefore require ultracold atomic temperatures operating on rapid repetition rates with efficient transport to the interferometer. At the University of Cambridge, we are developing technologies to cool and transport atoms efficiently. We are building a small-scale 1m technology demonstrator, which then jointly scales from 10m to 1km for enhanced sensitivities. Here, we report on our production of cold strontium atoms in a 3D "blue"magneto-optical trap (MOT), inside an ultra-high vacuum system that is centrally designed and constructed within AION. We also highlight our advances towards a 3D "red"MOT using a Pound-Drever-Hall locked narrow-linewidth laser and demonstrate initial sightings of atom-number enhancement via atomic shelving. This sets the stage for our next step to produce ultracold atomic clouds rapidly.

Session Classification: Poster Session & Wine & Coffee