A high-flux source of laser-cooled strontium atoms

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UK National Quantum Technology Hub Sensors and Metrology

Innovate UK

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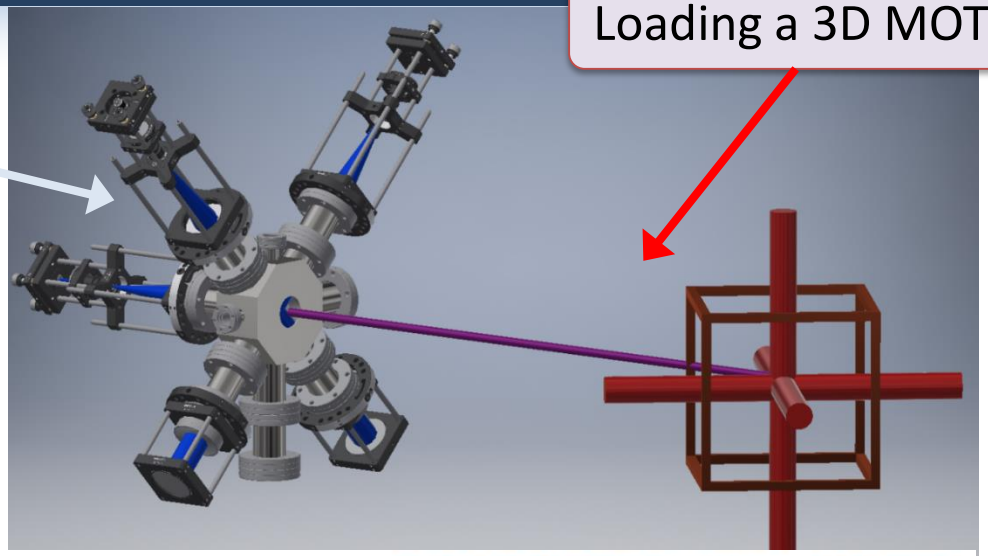
2D MOT cold-atom source

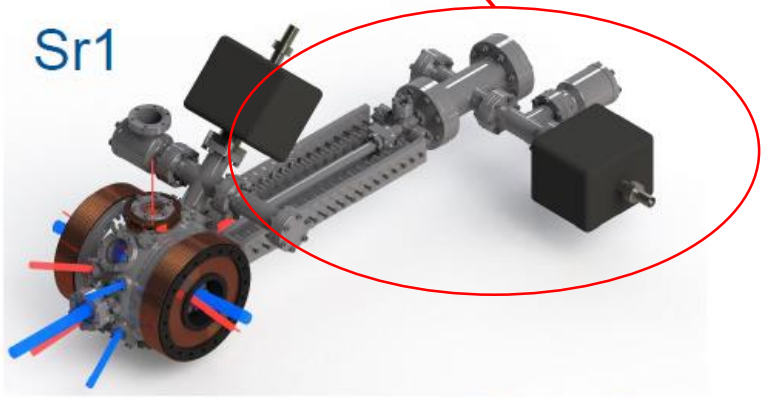
Loading a 3D MOT

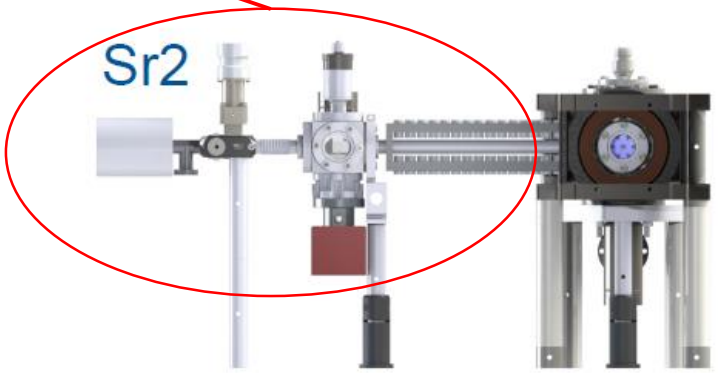


To replace Zeeman slower on existing set ups

NPL National Physical Laboratory | QMI Quantum Metrology Institute

Our current capabilities - NPL Sr lattice clock





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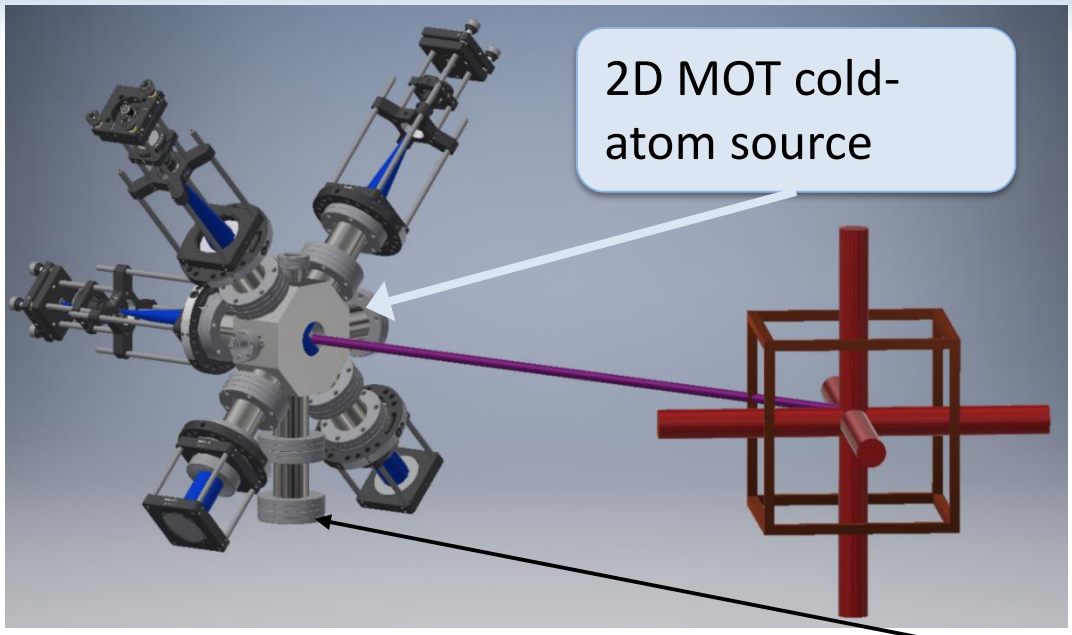
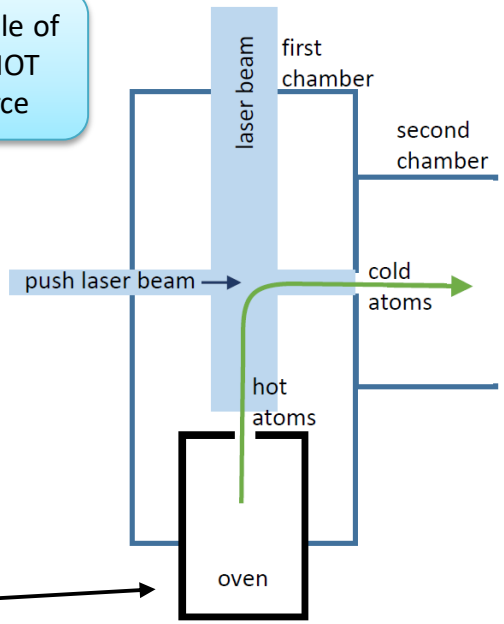
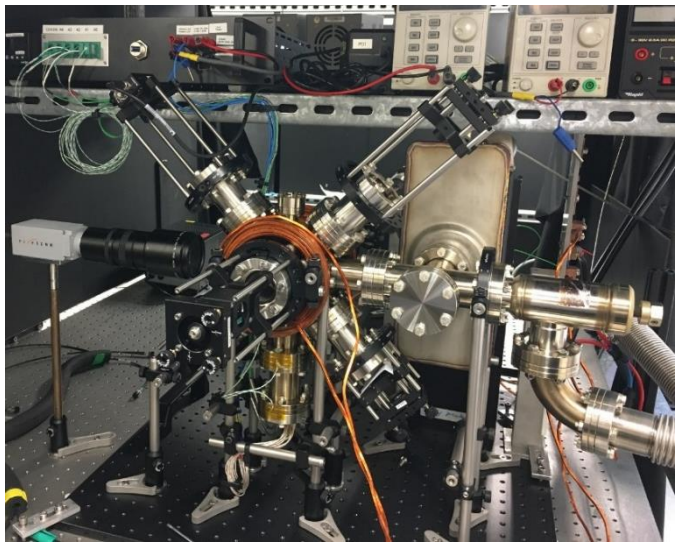
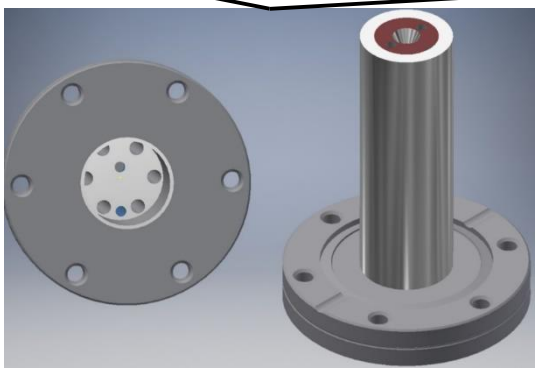


Principle of 2D MOT source

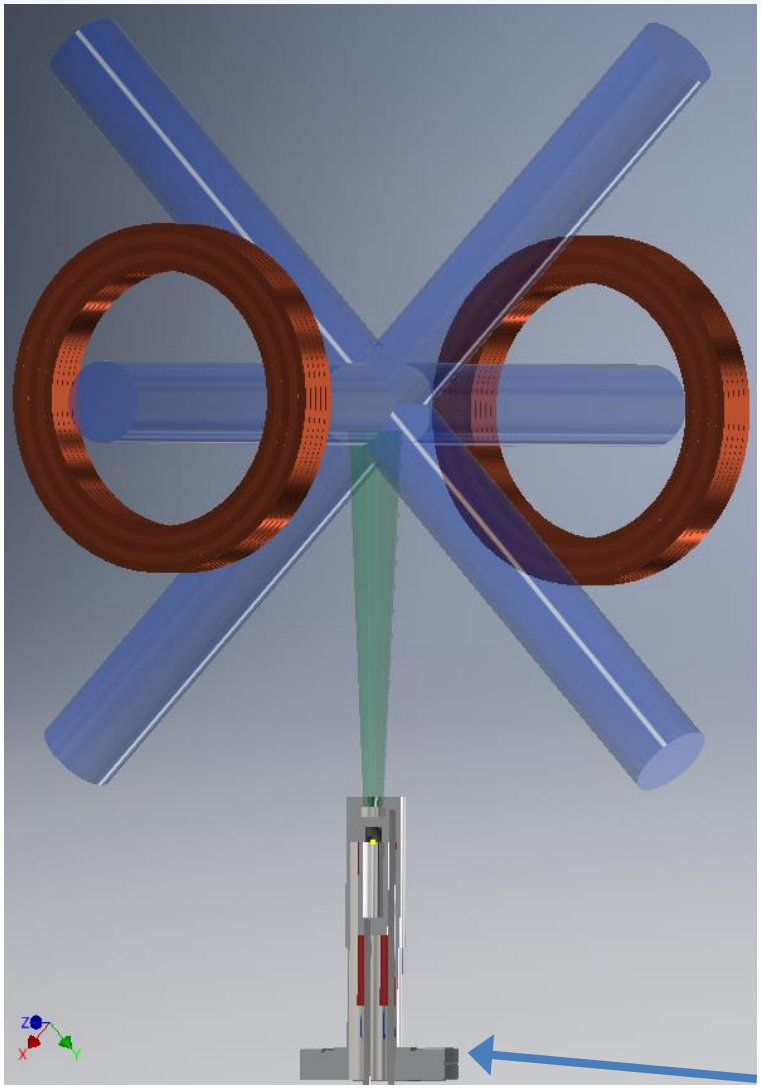




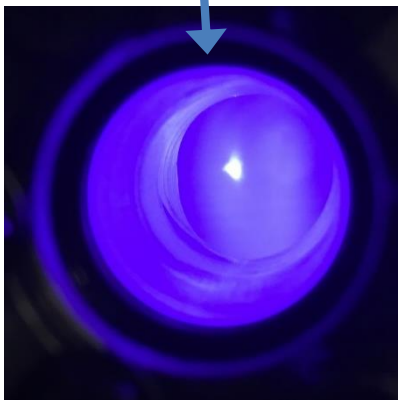


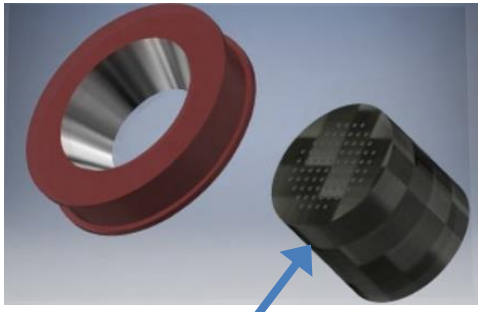
Stainless steel oven welded to CF40 flange

Test by making a 3D magneto-optical trap (MOT)

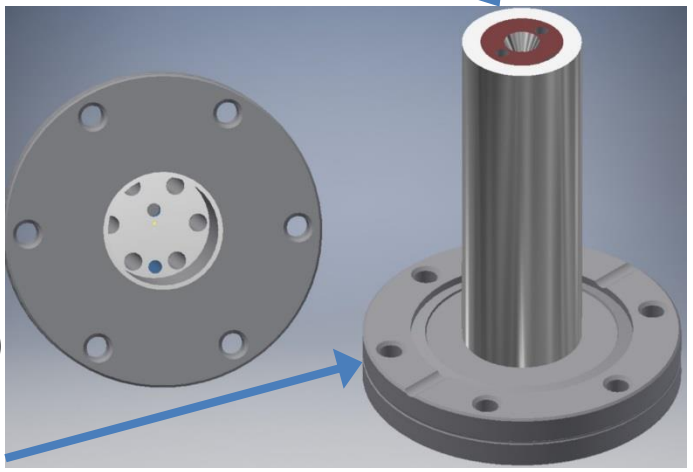


Blue fluorescence from atoms in MOT



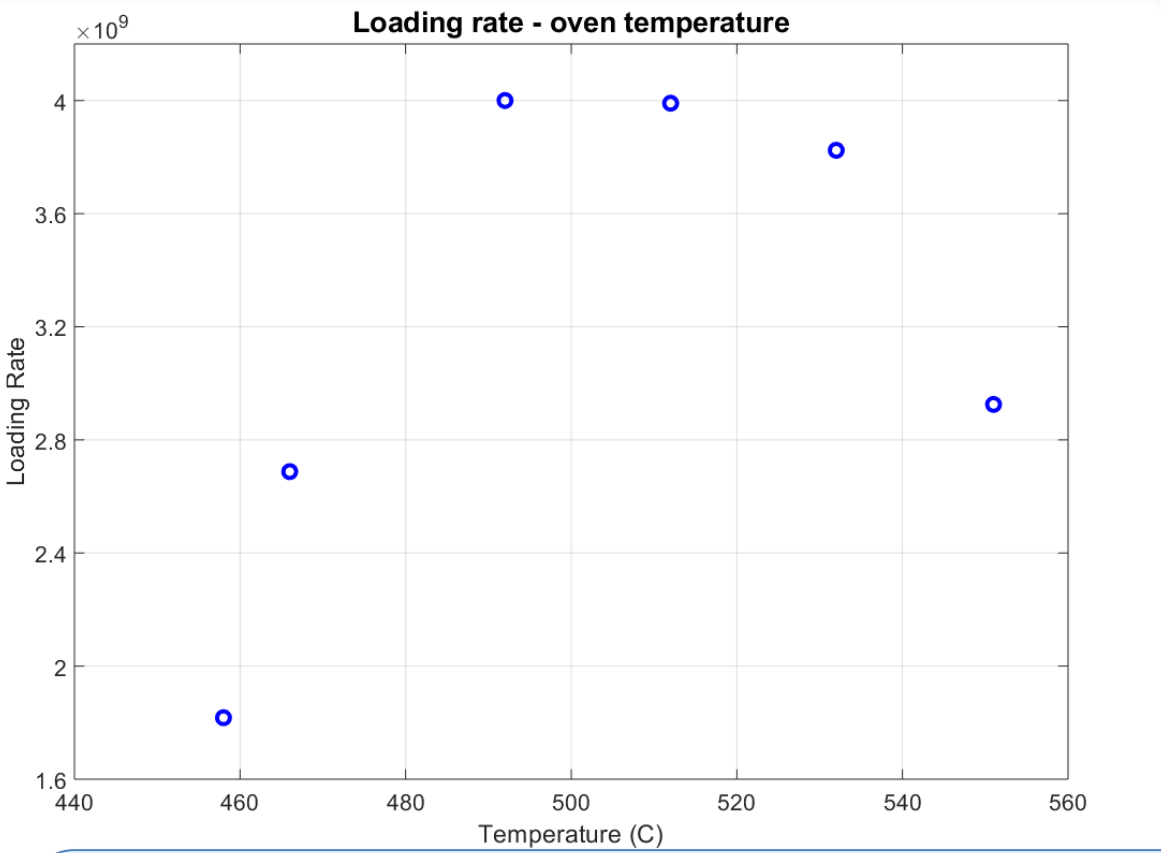


Multichannel nozzle



Stainless steel oven welded to a standard CF40 flange (tested up to 700 °C)

Preliminary testing of source



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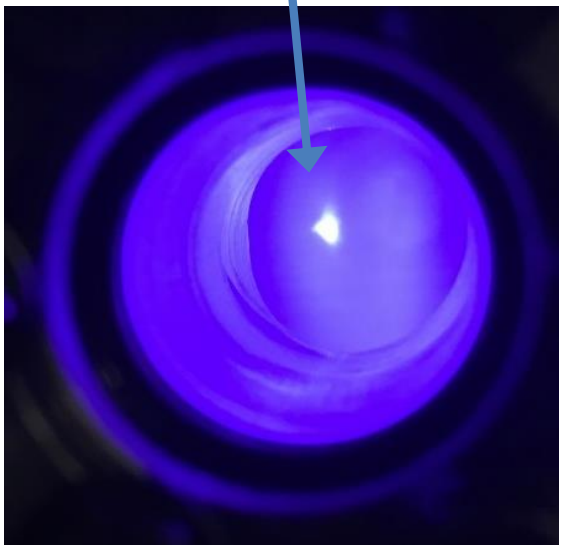

From loading rate of the 3D MOT, the cold atom flux is estimated to be > 10^9 s^{-1} strontium atoms (of the most abundant isotope). Further measurements are in progress.