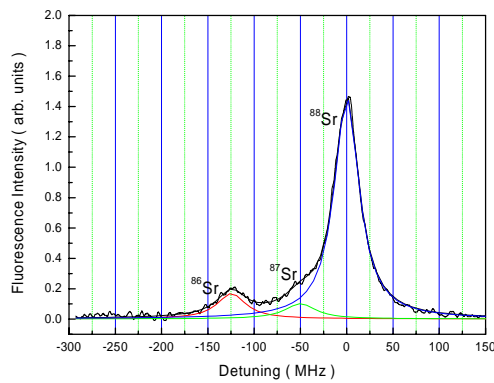


(a)



(b)

Figure 3. Saturated absorption signal in heat oven (a); laser induced fluorescence signal in atomic beam (b). The divergence of the atomic beam is less than 10 mrad.

In the case of trapping, the optical selectivity will be increased by repeating the absorption and the emission process just for an isotope. The fluorescence spectrum of MOT is shown in fig. 4. The frequency was scanned slowly, while the trap was in a steady state. If not, the spectrum becomes asymmetric and the spectral resolution reduces.

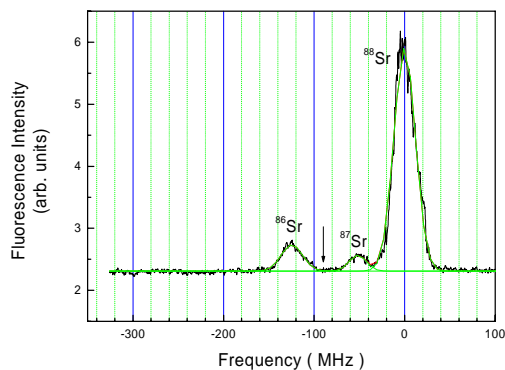


Figure 4. Fluorescence from the trapped atoms as a function of laser frequency. The fluorescence peaks are positioned at the red side of the corresponding resonance lines. The x-axis shows the relative frequency from the ^{88}Sr peak.

In this spectrum, the three peaks which originated from the three isotopes are completely resolved. However, the spectrum profiles have not been analyzed

so far due to the complexity of simulating the trap and the slowing. Instead of measuring the isotope selectivity, we compared the relative amount of ^{87}Sr and ^{88}Sr in the LIF experiment and the total background of the trap fluorescence at the same frequency position of -90 MHz from the ^{88}Sr peak.

The ratio of the relative amount of ^{87}Sr and ^{88}Sr in the LIF and the background in the trap was measured about 10. We expect that the real isotope selectivity at the ^{86}Sr position in MOT increase due to the sharp fluorescence profile.

4. Conclusion

Strontium MOT has been demonstrated and its fluorescence spectrum was compared to those of other spectroscopic techniques. The trap method provided a higher isotope selectivity than those of the Doppler free and limited techniques. In our experiment, the selectivity was at least ten times higher than that of the Doppler limited technique. Moreover, we expect the selectivity will be increased with a detailed investigation of the spectrum and it will be an efficient tool for an isotope selective measurement.

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