Table 3: Rubidium 87 D_2 ($5^2S_{1/2} \longrightarrow 5^2P_{3/2}$) Transition Optical Properties.

Frequency	ω_0	$2\pi \cdot 384.230\,484\,468\,5(62)$ THz	[9]
Transition Energy	$\hbar\omega_0$	1.589 049 462(38) eV	
Wavelength (Vacuum)	λ	780.241 209 686(13) nm	
Wavelength (Air)	λ_{air}	780.033 330(23) nm	
Wave Number (Vacuum)	$k_{\mathrm{L}}/2\pi$	12 816.549 389 93(21) cm^{-1}	
Isotope shift	$\omega_0(^{87}\mathrm{Rb}) - \omega_0(^{85}\mathrm{Rb})$	$2\pi \cdot 78.095(12)$ MHz	[10]
Lifetime	τ	26.2348(77) ns	[18–21]
Decay Rate/ Natural Line Width (FWHM)	Γ	$38.117(11) \times 10^6\ \mathrm{s}^{-1}$ $2\pi \cdot 6.0666(18)$ MHz	
Absorption oscillator strength	f	0.695 77(29)	
Recoil Velocity	v_{r}	5.8845 mm/s	
Recoil Energy	ω_{r}	$2\pi \cdot 3.7710$ kHz	
Recoil Temperature	T_{r}	361.96 nK	
Doppler Shift ($v_{\mathrm{atom}} = v_{\mathrm{r}}$)	$\Delta\omega_{\mathrm{d}}(v_{\mathrm{atom}} = v_{\mathrm{r}})$	$2\pi \cdot 7.5419$ kHz	
Doppler Temperature	T_{D}	145.57 μK	
Frequency shift for standing wave moving with $v_{\mathrm{sw}} = v_{\mathrm{r}}$	$\Delta\omega_{\mathrm{sw}}(v_{\mathrm{sw}} = v_{\mathrm{r}})$	$2\pi \cdot 15.0839$ kHz	

Table 4: Rubidium 87 D_1 ($5^2S_{1/2} \longrightarrow 5^2P_{1/2}$) Transition Optical Properties.

Frequency	ω_0	$2\pi \cdot 377.107\,463\,380(11)$ THz	[10]
Transition Energy	$\hbar\omega_0$	1.559 591 016(38) eV	
Wavelength (Vacuum)	λ	794.978 851 156(23) nm	
Wavelength (Air)	λ_{air}	794.767 119(24) nm	
Wave Number (Vacuum)	$k_{\mathrm{L}}/2\pi$	12 578.950 981 47(37) cm^{-1}	
Isotope shift	$\omega_0(^{87}\mathrm{Rb}) - \omega_0(^{85}\mathrm{Rb})$	$2\pi \cdot 77.583(12)$ MHz	[10]
Lifetime	τ	27.679(27) ns	[18, 19, 21]
Decay Rate/ Natural Line Width (FWHM)	Γ	$36.129(35) \times 10^6\ \mathrm{s}^{-1}$ $2\pi \cdot 5.7500(56)$ MHz	
Absorption oscillator strength	f	0.342 31(97)	
Recoil Velocity	v_{r}	5.7754 mm/s	
Recoil Energy	ω_{r}	$2\pi \cdot 3.6325$ kHz	
Recoil Temperature	T_{r}	348.66 nK	
Doppler Shift ($v_{\mathrm{atom}} = v_{\mathrm{r}}$)	$\Delta\omega_{\mathrm{d}}(v_{\mathrm{atom}} = v_{\mathrm{r}})$	$2\pi \cdot 7.2649$ kHz	
Frequency shift for standing wave moving with $v_{\mathrm{sw}} = v_{\mathrm{r}}$	$\Delta\omega_{\mathrm{sw}}(v_{\mathrm{sw}} = v_{\mathrm{r}})$	$2\pi \cdot 14.5298$ kHz	