Hyperfine splitting

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Value of Intensity for Ω=100 MHz

$$\Omega^2 = \frac{d^2 2c\mu_0 I}{\hbar^2}$$

where d is the transition dipole moment.
An alternate formula is

$$\Omega^2 = \frac{\gamma^2 I}{2I_{sat}}$$

Putting $I_{sat} = 1.67$ mW/cm^2 and $\gamma = 6$ MHz we get
$I = 0.928$ W/cm^2 for $\Omega = 100$ MHz.
Since Ω^2 is proportional to I, so for $\Omega = 200$ MHz we get $I = \sqrt{2}0.927$ W/cm$^2 = 1.312$ W/cm^2.

What intensity is used for a microwave transition of 6.85 GHz in the D2 line of Rubidium?
Saturation intensity of D2 line of ^{85}Rb is $I_{sat} = 1.66932$ mW/cm^2
Hyperfine splitting of 6.85 GHz is obtained using Zeeman splitting on 5s level of ^{87}Rb. In low field limit for hyperfine splitting dominates the Zeeman interaction ($\Delta E_Z << \Delta E^{\text{hfs}}$) the interaction hamiltonian is written as

$$H_Z = \frac{1}{\hbar}\mu_B g_F F_z B_z$$

Here g_F is the Landé factor which would be -0.5 for $F = 1$ and 0.5 for $F = 2$ approximately. For the hyperfine levels we have $\Delta^{\text{HFS}} = 2\pi \times 6.834$ GHz. For Rubidium D2 line we have that $\gamma = 2\pi \times 6.1$ MHz.

$$\Omega_{F_g,m_g,F_e,m_e} = \gamma\sqrt{\frac{I}{2I_{sat}}} d_{F_g,F_e} \langle F_e, m_e, 1, q|F_g m_g\rangle$$

In experimental apparatus two lasers (a master and slave) are used which have a difference in frequency by Δ^{HFS}. The magnetic field at the trap bottom is approximately set to 3.2 Gauss (see [1]).
The laser intensities are defined by the peak intensities

$$I = \frac{2P}{\pi w^2}$$

Here w is the $1/e^2$ Raman beam waist at the atomic cloud which approzimately comes as 140μm, and P is the laser power which has been varied 0 to 75μW. In [1] the values which were experimentally tested were for slave intensity of $I_S = 92 \pm 18$ mW/cm^2 with master intensity being $I_P = 0.42 I_S$. On fitting the experimental data with a lorentzian distribution for the power we get a FWHM of 1.7 ± 0.1kHz.

References

[1] Stimulated Raman Transitions Between Hyperfine Ground States of Magnetically Trapped Rb-87 Atoms
[2] Two-Photon spectroscopy of rubidium in the vicinity of silicon devices