This model fits the experimental results rather well. For example, the predicted ratio of the relaxation oscillation frequencies of the $x$ and $y$ modes is

$$\frac{\omega_x}{\omega_y} = \frac{C_1 \cos^2 \alpha + C_2 \sin^2 \alpha}{C_1 \sin^2 \alpha + C_2 \cos^2 \alpha} \frac{P_p}{P_{pa}}.$$  

Equation (3) indicates that $\omega_x/\omega_y$ decreases as the pump power increases, in accordance with experiment and as illustrated for the particular case of $\alpha = 0$ in Fig. 2. Furthermore the predicted degree of polarization (DOP) also fits well with measurement, as can be seen in Fig. 1.

In particular, the relative slope efficiencies of the $x$ and $y$ modes are found to be

$$\text{SLOPE}_x = \frac{C_1 \cos^2 \alpha + C_2 \sin^2 \alpha}{C_1 \sin^2 \alpha + C_2 \cos^2 \alpha},$$

$$\text{SLOPE}_y = \frac{C_1 \sin^2 \alpha + C_2 \cos^2 \alpha}{C_1 \cos^2 \alpha + C_2 \sin^2 \alpha},$$

which again fits well with experimental measurements (Fig. 3).

The ratio $S_x/S_y$ can be measured accurately and enables values of the polarization cross-section ratio $A$ to be deduced. From the results given for fibers containing erbium and neodymium $A$ has values of 0.11 and 0.01, respectively, showing that these ions have very strong polarization anisotropy of the stimulated emission cross-section.

(Poster paper)

