2. Es kann eine obere Grenze für das Mischungsverhältnis des 6,79 MeV-Überganges angegeben werden*:

$$0<\delta<0{,}15\,.$$

Die Bestimmung des Mischungsverhältnisses ist zur eventuellen Durchführung eines Zeitinvarianzexperimentes interessant[10]. Bei diesem Experiment werden γ-γ-Koinzidenzen nach Einfang polarisierter Neutronen bei gemischten Übergängen untersucht. Besonders geeignet ist ein Übergang mit $\delta=+1$ und der Spinfolge $1\rightarrow 1\rightarrow 0$, welche beim ^{32}P vorliegt.

Leider zeigt obige Messung nur ein kleines Mischungsverhältnis, so daß die Eignung dieses Überganges fraglich ist.

Herrn Prof. Dr. H. SCHOPPER danke ich für die Anteilnahme an den Experimenten. Herr Dr. W. SCHULER war an dem Aufbau der Apparatur beteiligt, wofür ich ihm sehr verbunden bin.

* Siehe Fußnote S. 359.

[10] KAJFOSZ: Phys. Letters 24B, 443 (1967).

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Theory of Mode Pulling in a Stokes Raman Oscillator. I

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In the present paper frequency shifts and other characteristic properties of the Stokes modes in a solid Raman-active sample are investigated theoretically. The Raman process is described by nonlinear Heisenberg equations for running waves, which is convenient in order to satisfy the momentum conservation condition. The Stokes shifted electromagnetic waves are assumed to be reflected at the endfaces of the crystal to establish standing waves (modes), whereas the vibrational waves are treated as running waves because of their large damping. The calculations are done for (a) one mode in the 1. Stokes line, (b) one mode in the 1. and one mode in the 2. Stokes line and (c) two modes in the 1. Stokes line. Case (c) can be established only if the two modes are placed symmetrically with respect to the center of the line. In all three cases homogeneously broadened lines are assumed. The frequency shifts in (a) and (c) are power-independent. Only in (b) the shift of the 1. Stokes mode depends on the incident laser flux. Nonlinear pulling and power-dependent pushing of arbitrarily situated modes in the 1. Stokes line occur if additonal modes oscillate simultaneously in the higher order lines. Detailed calculations of these interesting cases are given in a forthcoming paper.

I. Introduction

Recently TANNENWALD[1] has observed Stimulated Raman Scattering (SRS) in quartz at low temperatures in which the 467 cm^{-1} 1. Stokes line is split into several components. His measurements are describable in terms of the quartz crystal behaving as a Stokes Raman oscillator. The Raman Stokes splittings correspond nearly to the Fabry-Perot resonant modes of the quartz samples, but the modes are spaced 5–20% closer than it is predicted by the cavity (sample) lengths. Only in a few cases splitting of modes could be reached at higher temperatures, the mode separation being nearer normal, i.e. mode pulling being smaller. When three modes were observable, the weaker lines were pulled the most, i.e. those modes, which are displaced farther from the line center. At higher power levels TANNENWALD qualitatively observed a decrease of the pulling (mode pushing). The same effect was obtained when the cavity Q was raised. Besides the 1. Stokes line the 2. Stokes line occasionally was also split into components.

[1] TANNENWALD, P.E.: J. Appl. Phys. 38, 4788 (1967); — Proc. of the Siberian Academy of Sciences (to be published).