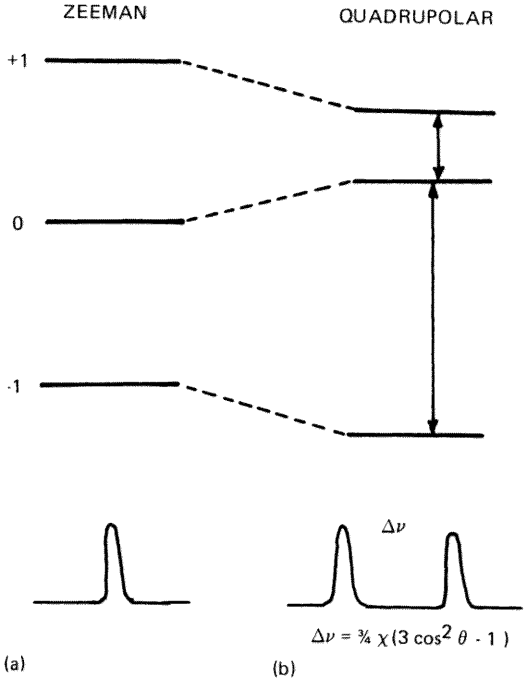

Figure 4.2 Nuclear spin energy levels for a spin = 1 nucleus (e.g., ^2H) showing the allowed transitions (a) for an isotropic and (b) an axially symmetric electrical field gradient.

$$S_{CD} = 1/2 \overline{(3\cos^2\Theta - 1)} \qquad [2b]$$

Here the bar in Eq. 2b represents the averaging over all possible orientations of the randomly dispersed lamellar domains. Many studies have now been carried out to derive order profiles in lipid and surfactant systems in lyotropic lamellar phases (5–18). The form of the profile (Fig. 3) is remarkably consistent for a wide variety of systems showing highest order (S_{CD} values) in the segments of the amphiphilic chains closest to the head group. A rapid decrease in order, as expressed by S_{CD}, is seen in the methylene segments near the terminal methyl group, which is located at the center of the bilayer. The shape of this type of profile is a result of the packing constraints in the associated bilayer structure, reducing the conformational freedom of the individual chains (17,18).