Comments on the Lifshitz conditions

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It is known that there are many phase transitions triggered by irreducible representations which are inactive from the viewpoint of the Lifshitz condition.

We examine this feature by studying concretely the Fourier-transformed dipole interaction matrix based on the model which reflects the symmetry aspect of the Rochelle salt crystal.

On the Phase Transition of K_2SeO_4

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It seems almost certain that the M phase of K_2SeO_4 belongs to $Pna2_1$ (C_{2v}^{9}), though the crystal lacks the evidences of the polar nature. This apparent contradiction can be solved by assuming that the high temperature phase of the crystal belongs to D_{6h}^{4}, and the M phase arises as the greatest common measure of two orthorhombic non-polar phases D_{2h}^{16} and D_{2h}^{14} which are, respectively, induced by the modulations of the wave vectors $k = \frac{1}{2} a_2^*$, and $k = \frac{1}{2} a_2^* + \frac{1}{3} a_3^*$.