Rotational-vibrational coupling

Rotational-vibrational coupling occurs when there is a 1:2 ratio of rotation frequency of an object and a natural internal vibration frequency. The animation on the right shows the simplest example of this phenomenon. The motion depicted in the animation is for the idealized situation that the force exerted by the spring is proportional to the amount of extension. Note that in this demonstration the spring isn't alternating between pulling and pushing, the spring is exerting a contracting force all the time; given the chance the idealized spring would contract all the way down to zero length. Also, since the animation keeps on looping, the animation depicts what would occur if there would not be any friction.

In molecular physics it is recognized that there is a coupling of rotational and vibrational energy-levels. In molecular physics **rotational-vibrational coupling** is also called rovibronic coupling and Coriolis coupling. The physics of actual diatomic molecules is more complicated than the example in the animation, but because of its simplicity the animation is useful for illustrating the basic principles. See http://www.cleonis.nl/physics/phys256/coupling.php for animations mentioned in this article.

See Also

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11 - Key to Vibratory Rotation
12.11 - Eighteen Attributes or Dimensions
12.37 - Axial rotation
Atomic Rotation
Berry Phase
Connecting Link
Coupling
Etheric Rotation
Figure 13.05a - Complex Vortex Rotational Dynamics
Rotation
Rovibrational coupling
Rovibronic coupling
Vibronic coupling