

Phase-space visualization of quantum phase transitions in the molecular vibron model

Elvira Romera¹

¹ Departamento de Física Atómica, Molecular y Nuclear, Instituto Carlos I de Física Teórica y Computacional, University of Granada, Spain.

We will present a phase-space visualization of quantum phase transition in a linear algebraic model, the vibron $U(3)$ model. This model has been used to study the rovibrational properties in diatomic and polyatomic molecules and has turned to be very useful to study symmetry properties of quantum systems. We will show that entropic uncertainty relations give a more appropriate description of the QPT than the usual variance-based uncertainty relation in this model. We will propose a characterization of the vibron-model quantum phase transition by means of the zeros of the Husimi distribution.

[1] E. Romera, M. Calixto and Á. Nagy, *EPL*, 97 2011, (2012)

[2] E. Romera, R. del Real, M. Calixto, S. Nagy and Á. Nagy, *J. Math. Chem.* 51, 620 (2013)

[3] M. Calixto, R. del Real, and E. Romera, *Phys. Rev. A* 86, 032508 (2012).