

# Capture into resonance in dynamics of a classical hydrogen atom in an oscillating electric field

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## **Abstract**

We consider a classical hydrogen atom in a linearly polarized electric field of slowly changing frequency. In the process of evolution, the system passes through resonances between the driving frequency and the Keplerian frequency of the electron's motion. At a resonance, a capture into the resonance can occur. After the capture, the system evolves in such a way that the resonance condition is approximately preserved, and parameters of the electron's orbit are varying. We study this phenomenon in the case of 2:1 resonance and show that the capture results in growth of the eccentricity of the electron's orbit. It strongly depends on the initial conditions, whether the capture occurs or not. Hence, the capture can be considered as a probabilistic phenomenon. The capture probability is defined and calculated.