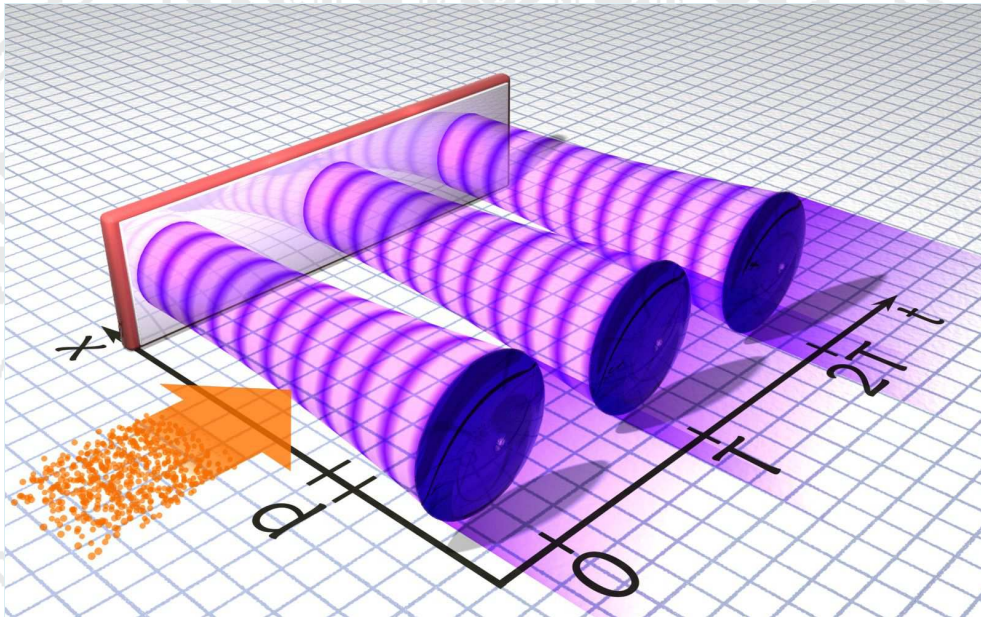


# PHYSIKALISCHES KOLLOQUIUM

AM 21. JULI 2014 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



## PROBING THE QUANTUM SUPERPOSITION PRINCIPLE

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Does the quantum superposition principle hold on mesoscopic or even macroscopic scales? The tremendous success of quantum theory notwithstanding, this question remains unsettled to date. I will discuss experimental tests of the quantum superposition principle, such as matter wave interferometry with large particles [1,2], as well as their implications on theories predicting a breakdown of quantum mechanics at macroscopic scales. I will also explain how the degree of macroscopicity reached in various superposition experiments can be assessed and compared [3].

[1] K. Hornberger, S. Gerlich, P. Haslinger, S. Nimmrichter, and M. Arndt, Quantum interference of clusters and molecules, *Rev. Mod. Phys.* 84, 157 (2012)

[2] M. Arndt and K. Hornberger, Testing the limits of quantum mechanical superpositions *Nature Phys.* 10, 271-277 (2014)

[3] S. Nimmrichter and K. Hornberger, Macroscopicity of mechanical quantum superposition states, *Phys. Rev. Lett.* 110, 160403 (2013)