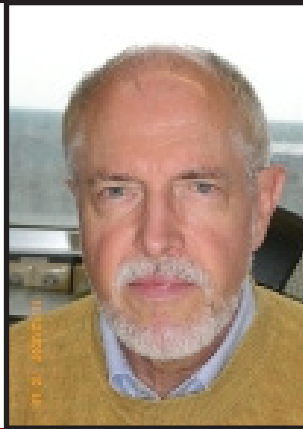


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# The Kondo Effect From Magnetic Alloys to Nanoelectronics

Department of Physics Colloquium

**A**fter introducing the problem and some historical remarks I show how the Kondo effect may be understood as a collective many-body effect, present whenever a local degree of freedom (spin) is coupled to a continuum of excitations. A comparison with selected experiments serves to highlight the essence of the Kondo effect. Then the Kondo effect in quantum dots is introduced and salient features are reviewed. It is shown how the theory needs to be modified to account for nonequilibrium transport through Kondo dots. Examples of how the Kondo effect is suppressed and how it may be created by finite bias voltage are shown. Finally the role of the Kondo effect in creating “heavy electron metals” is described and the fascinating physics of quantum phase transitions in these compounds is highlighted.

