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Microscopic Theory of the Knight Shift BIANCA HALL, Univ of Central Florida — The Knight shift has been used for detecting possible parallel spin states, such as Sr_2RuO_4. However an improved theory of the Knight shift is needed to explain anomalies that have been found in a variety of superconductors below the superconducting transition temperature. The standard model includes the Zeeman and hyperfine interactions of the magnetic field and the electron-electron pairing interaction necessary for superconductivity. The new model now includes a term based on the Anderson model of local moments in metals. The local electron states in the original Anderson model now correspond to local atomic electron orbitals. When these orbital energies are singly occupied and close to the Fermi energy, the spins of the electrons can interact with the nuclear spins and the spins of the electrons in the conducting bands. Additionally, the paths of the electrons in the conduction bands depend on the direction and magnitude of the magnetic induction. With these new terms included, this model has the potential to describe the anomalous behavior seen in Knight shift measurements on unconventional superconductors.

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