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**Quantized Ferromagnetic Moments of Free Cobalt Clusters XI-**

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The magnetic moments  $\mu(N)$  of free  $\text{Co}_N$  ( $20 \leq N \leq 200$ ) clusters has been measured in a cryogenic molecular beam. Besides the ground states with  $\mu(N)/N \sim 2 \mu\text{B}$ , an electronic state has been found in all clusters studied. The magnetic moments  $\mu^*(N)/N$  of this state is approximately  $1/2 \mu(N)/N$ . Ionization potential of Co clusters at each of the two states are determined from photo-ionization efficiency measurements. The ionization potentials for the excited states are systematically lower than that for ground states by about 100meV for small clusters, and merge for larger clusters ( $N > 100$ ). This suggests that molecular magnetism of small clusters evolves to itinerant (band) ferromagnetism in the bulk ( $\mu(N)/N \sim 1.7 \mu\text{B}$ ) when the energy gap between these two states vanishes.

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