Analytic descriptions of magnetic Feshbach resonances in nonzero partial waves[1] BO GAO, University of Toledo — We present analytic descriptions of atomic interaction and pairing at ultracold temperatures with emphasis on magnetic Feshbach resonances in nonzero partial waves. Formulas will be presented both for the binding energies below the threshold and for the Feshach/shape resonances above the threshold. The results are derived from the quantum-defect theory and are applicable to both broad and narrow Feshbach resonances, the differences of which will be rigorously defined. We will also introduce a generalized scattering length that is well defined and useful for all partial waves, to replace the traditional definition that fails for $l \geq 2$ due to the long-range van der Waals interaction.

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