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Título: Nucleon-Nucleon Interaction And The Nuclear Many-Body Problem, The

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Sinopsis

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This book provides a comprehensive overview of some key developments in the understanding of the nucleon-nucleon interaction and nuclear many-body theory. The main problems at the level of meson exchange physics have largely been solved, and we now have an effective nucleon-nucleon interaction, pioneered in a renormalization group formalism by several of us at Stony Brook and our colleagues at Naples, which is nearly universally accepted as the unique low-momentum interaction that includes all experimental information to date.

Our present understanding of these issues is based on a multi-step development in which different scientific insights and a wide range of physical and mathematical methodologies fed into each other. It is best appreciated by looking at the steps along the way, starting with the pioneering work of Brueckner and his collaborators that was just as necessary and important as the insightful improvements to Brueckner's theory by Hans Bethe and his students. Moving on from there, microscopic methods for nuclear structure calculations using the Brueckner G-matrix, and later low-momentum nucleon interactions, were developed and applied. With their influential 1967 paper, Brown and Kuo prepared the effective theory that allowed the description of nuclear properties directly from the underlying nucleon-nucleon interaction. Later, the addition of Brown-Rho scaling to the one-boson-exchange model deepened the understanding of nuclear matter saturation, carbon-14 dating and the structure of neutron stars.