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Pionic atoms: Pion-nucleon interactions at threshold

abstract: The interaction of pions with baryons is a consequence of the breaking of the underlying chiral symmetry which is quantifiable at low energies by effective field theories (EFT). As there is no qualitative difference between the interaction of a physical pion in a scattering process or acting as field quanta for nuclear binding, processes like scattering on nucleons, absorption or production off nucleon clusters and bound nuclear systems must be treated on the same footing. Consequently, within an EFT approach the parameters of reactions like  $pN \rightarrow pN$  and  $pN \rightarrow pNN$  and directly related.