Nuclear Forces from Chiral EFT: Achievements and Challenges

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In the past decade, there has been substantial progress in the derivation of nuclear forces from chiral effective field theory (EFT) [1]. Accurate two-nucleon forces have been constructed at next-to-next-to-next-to-leading order (N^3LO) and applied (together with three-nucleon forces at NNLO) to nuclear few- and many-body systems — with a good deal of success. This may suggest that the 80-year old nuclear force problem has finally been cracked. Not so! Some pretty basic issues are still unresolved. In this talk, I focus on the two most pressing ones, namely, the proper renormalization of the two-nucleon potential and subleading many-body forces.

References

[1] R. Machleidt and D. R. Entem, *Physics Reports* **503** (2011) 1-75.