Non-Empirical Pairing Functional for Nuclei

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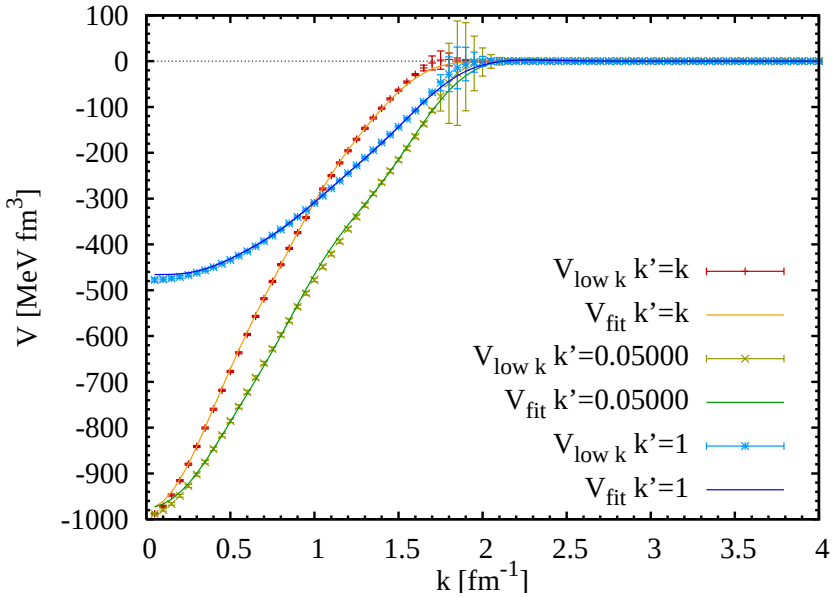
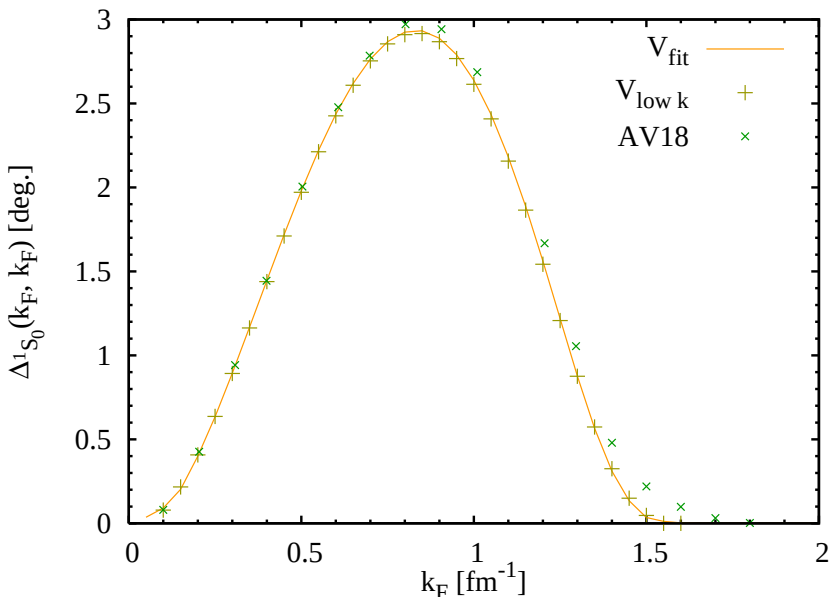
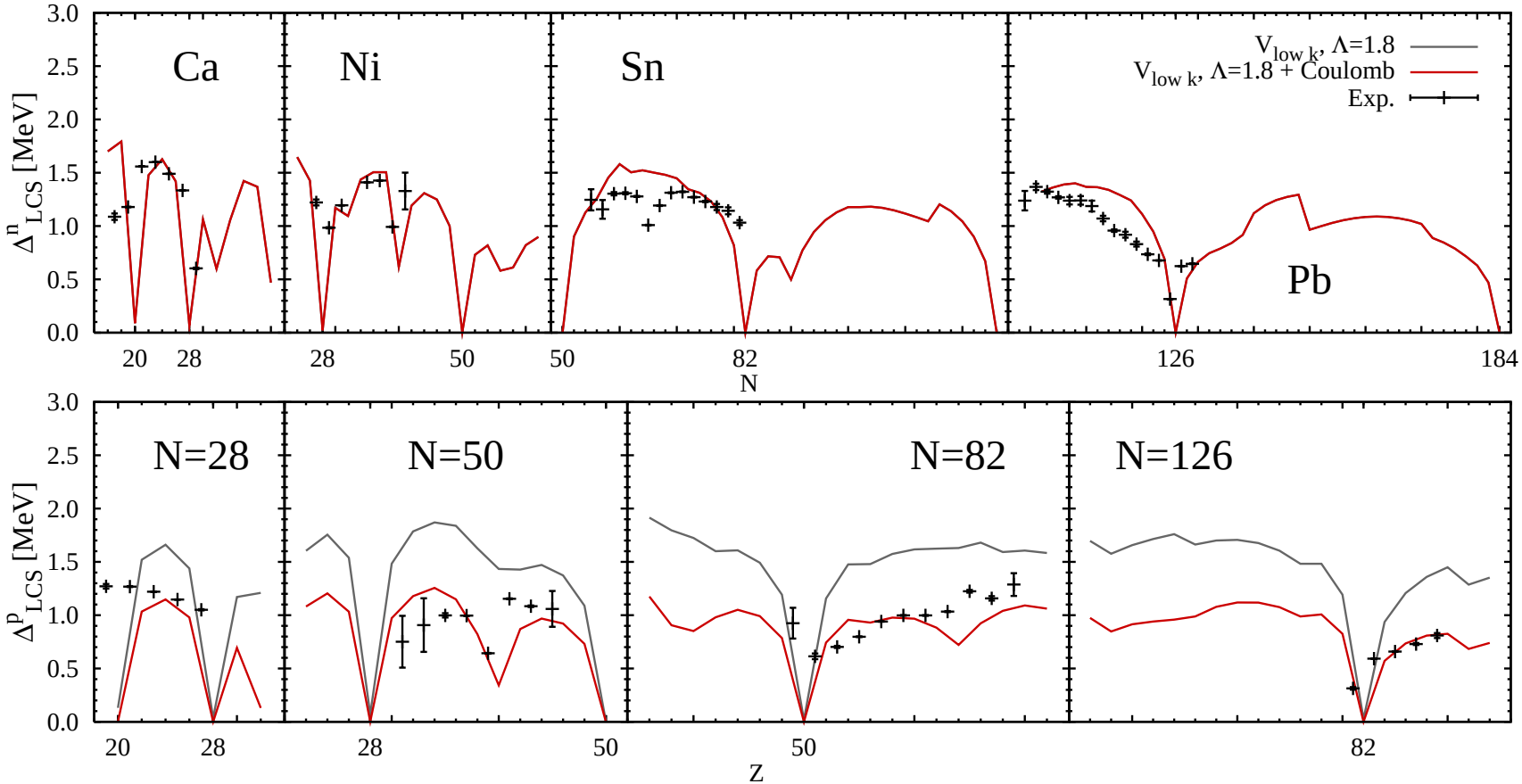
- New spherical code BSLHFB
  - spherical Bessel function basis
  - finite-range / non-local pairing interactions in EDF
  - operator representation: sum of separable terms (rank 2 for $V_{\mathrm{low}\,k}$)
- Pairing at lowest order in NN (nuclear + Coulomb)
  - use $V_{\mathrm{low}\,k}$ at $\Lambda \approx 2\,\mathrm{fm}^{-1}$ as NN pairing interaction
  - Use SLY5 Skyrme for ph EDF with fixed $m_0^*/m = 0.7$
- Studied $m^*(k, k_\mathrm{F})$ for cutoffs Λ (K. Hebeler, T.D., A. Schwenk)
  - consistent ph/pp scales needed
  - $V_{\mathrm{low}\,k}$ ok with $m^*_{\mathrm{Skyrme}}(k_\mathrm{F})$





Pairing Gaps from $V_{\mathrm{low}\,k}$ + Coulomb Near Data!



- Current limitations
  - Three-body force missing
  - No density/spin/isospin fluctuations (Milan: +40%!?)
  - Phenom. ph functional and momentum-independent m_0^*
- Upgrade plans
  - Other observables (Lesinski), deformed nuclei (Rotival)
  - Incorporate NNN (Lesinski)
  - Check fluctuations
  - Construct ph part (BG, VR)