Density-independent P-wave term in Skyrme ; T. Lesinski et al. PRC, in print

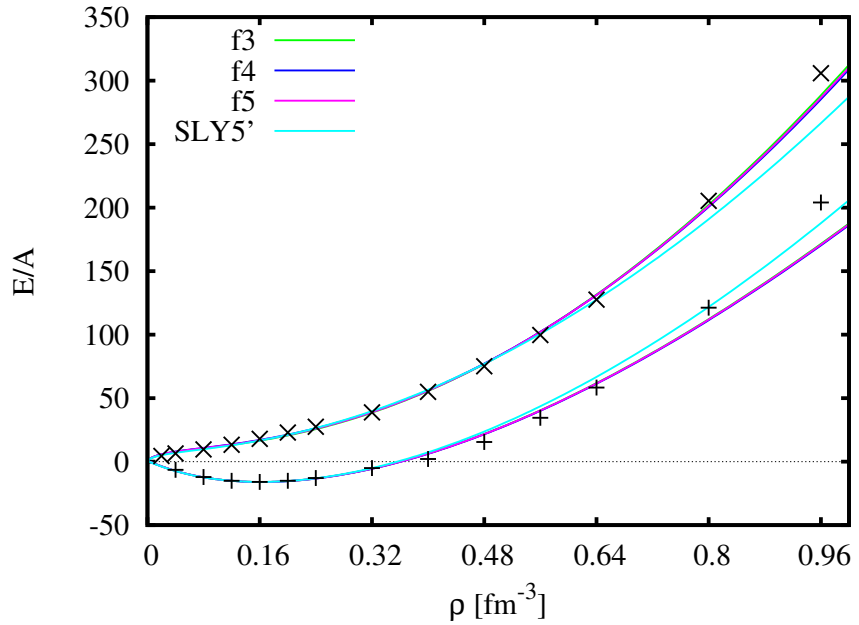
♣ Attempt to identify over/under-constrained terms in *realistic* fits

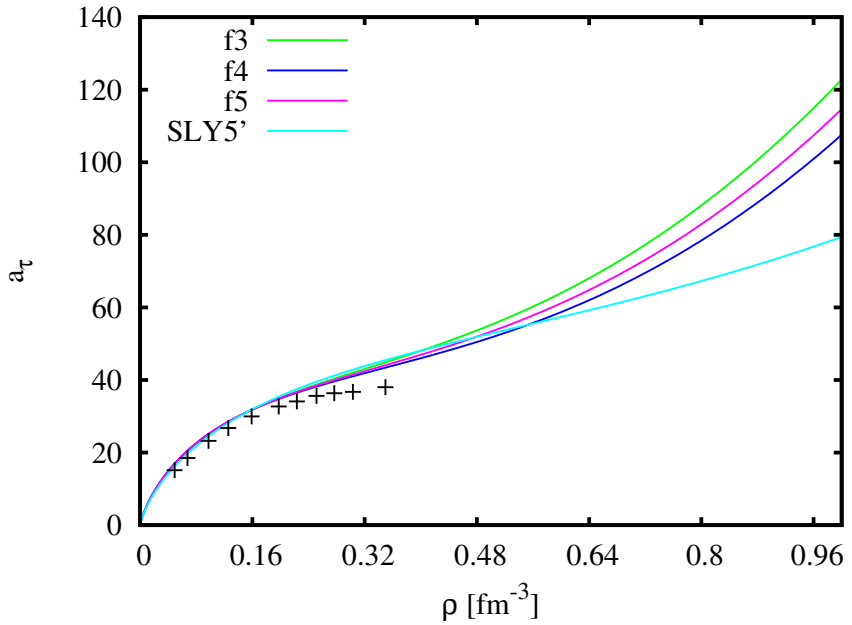
♣ In the Skyrme "force": $t_2\,(1 + x_2 P_\sigma)\,\vec{k}' \cdot \delta(\vec{r})\vec{k}$

♣ $(m^*_s, \Delta m^*_{n-p})$, a_{surf}, spin-isospin instabilities, $\mathcal{E}^{(S,T)}_{pot}$, a_{sym}, "tensor" terms $\vec{J}^2_T$

♣ Parameterizations (f_3, f_4, f_5) with same fitting protocol as for SLy5 but different Δm^*_{n-p}

	ρ_{sat}	E/A_{sat}	K_∞	a_I	m^*_s	$\Delta m^*_{n-p}\|_{I=1}$
SLy5'	0.161	-15.987	230	32	0.70	-0.182

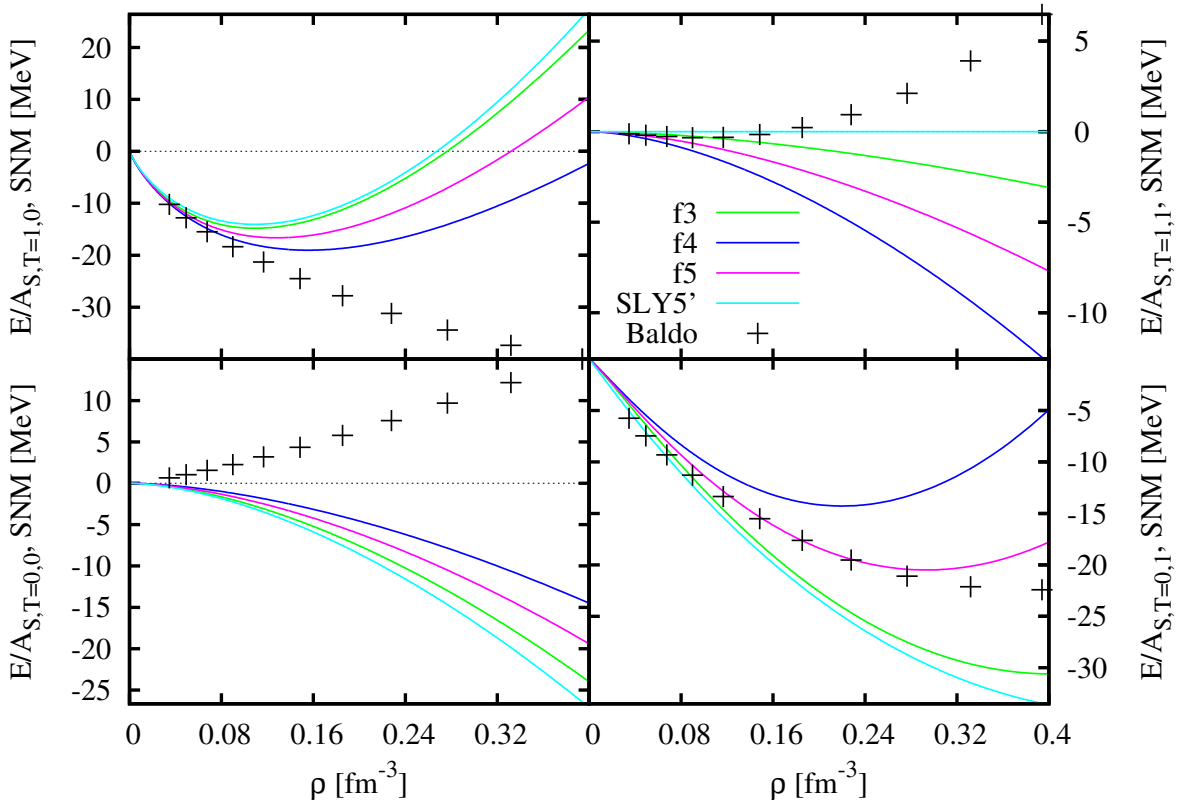




♣ Identical properties for (f_3, f_4, f_5) and as good as SLy5'

♣ Is it a good enough test of the quality of isovector properties of the functional ?

♣ Correlation energy per (S,T) channel $\mathcal{E}_{pot}^{(S,T)}$ in SNM versus ab-initio predictions



♣ $(S,T) = (1,1); (0,0)$ (P-wave term) are disastrous + gets worse as $\Delta m^*_{n-p}|_{I=1}$ is improved

♣ ρ_{crit} of infinite λ spin-isospin instabilities $\searrow$ as $m^*_s \nearrow 0.8$

♣ New *finite-size* instabilities as $\Delta m^*_{n-p}|_{I=1}$ is improved

♣ Spurious modes at finite $\vec{q}$ controlled in the fit via RPA calculations in SNM

★ **Extending the P-wave term**: density-dependence? Relax time-odd/even? Both from DME?

★ **Constraint via ab-initio inputs are needed**