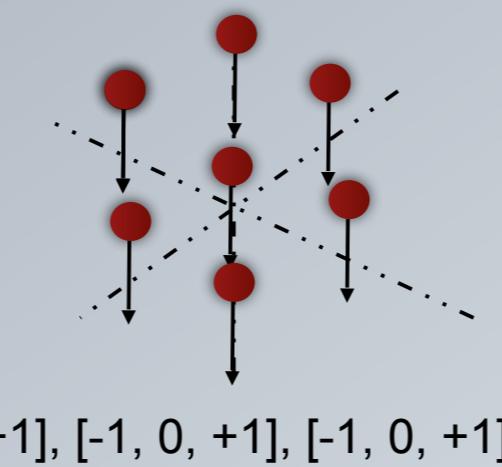
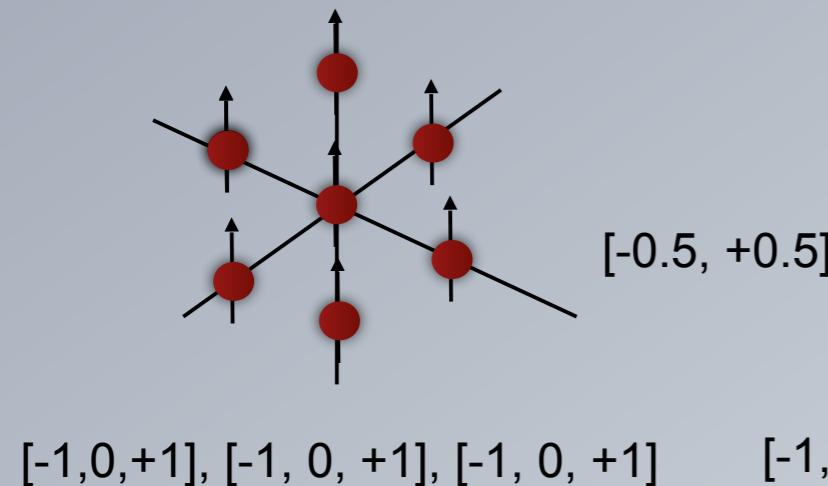




1) Momentum space basis



e.g. $N_{\max} = 1$

$$n_x^2, n_y^2, n_z^2 \leq N_{\max}^2$$

$$N_{\text{fermi}} = 14$$

$$N_{\text{particles}} = 40$$

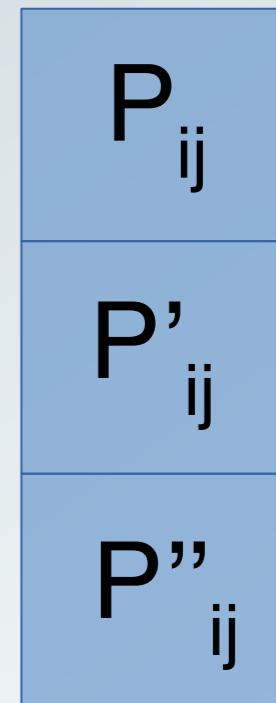
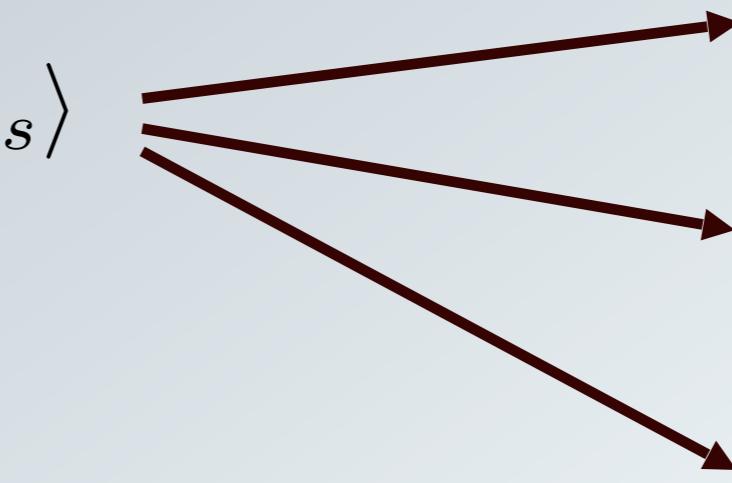
$$N_{\text{fermi}} = \rho L^3$$

2) Two particle states and grouping into P_{ij} channels

$$|k_r s_r k_s s_s\rangle \longrightarrow |P_{rs} k_{rs} s_r s_s\rangle$$

Less efficient

$$[k_x, k_y, k_z] \longrightarrow [n_x, n_y, n_z] 2\pi/L$$



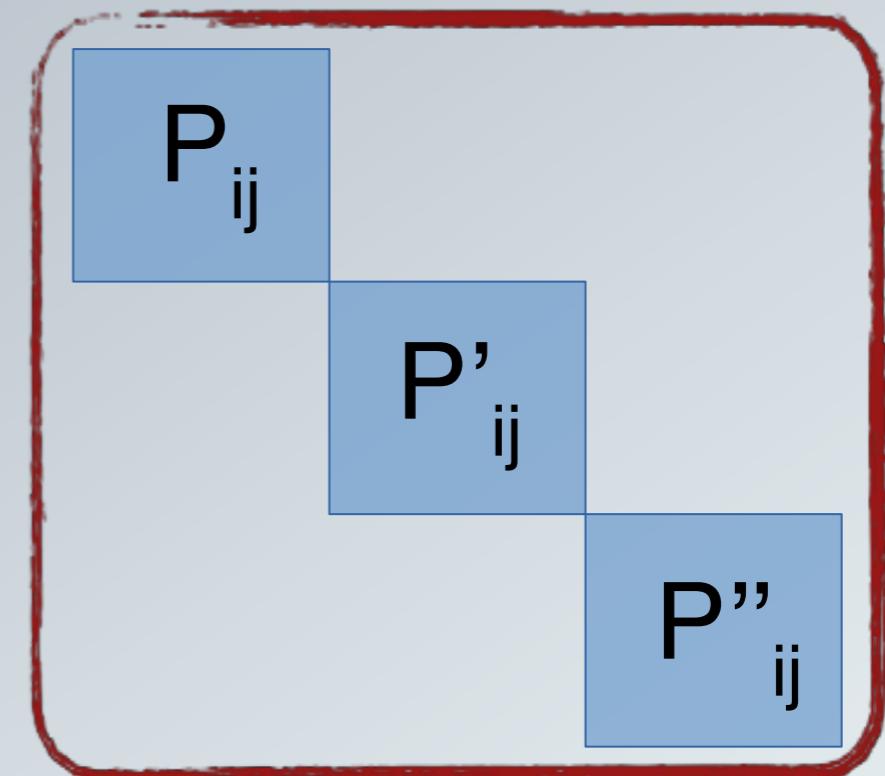
Neutron Matter



3) Matrix element calculation using Minnesota potential

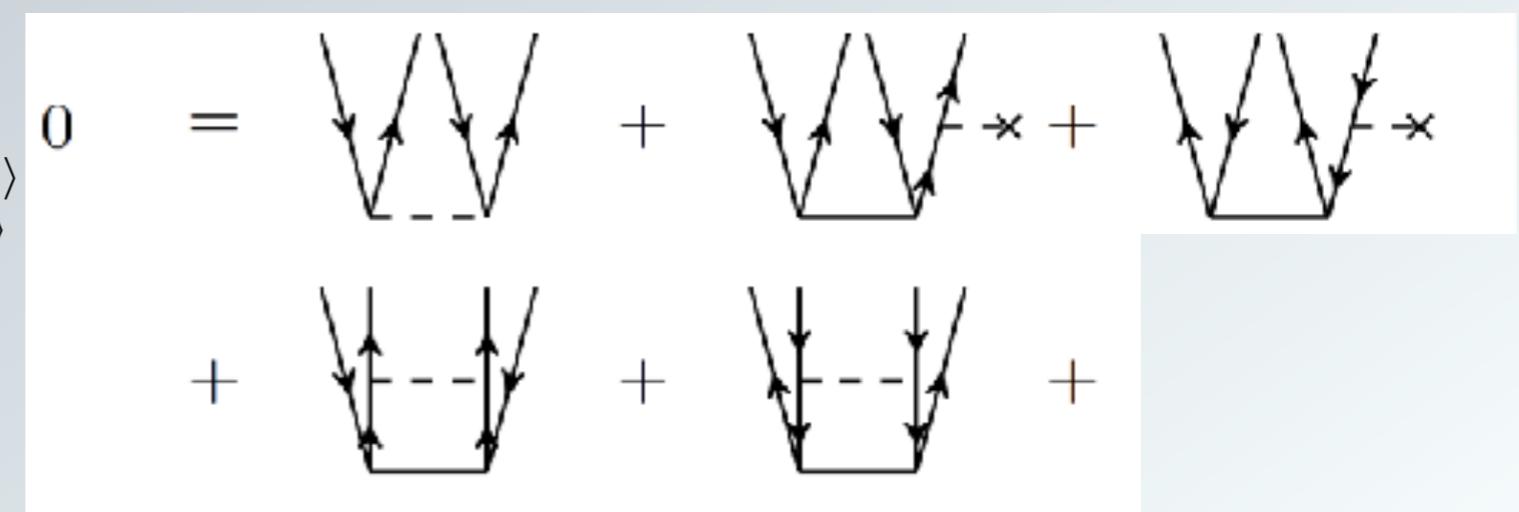
$$\langle k_p k_q | V_\alpha | k_r k_s \rangle = \frac{V_\alpha}{L^3} \left(\frac{\pi}{\kappa_\alpha} \right)^{3/2} e^{-\frac{q^2}{4\kappa_\alpha}} \delta_{k_p+k_q}^{k_r+k_s}$$

$T =$



4) CCD using channel matrix multiplication iteration

$$\frac{1}{2} \sum_{|k_c d s_c s_d\rangle} [V(P_{ij})]_{|k_c d s_c s_d\rangle}^{|k_a b s_a s_b\rangle} [t(P_{ij})]_{|k_i j s_i s_j\rangle}^{|k_c d s_c s_d\rangle}$$



Neutron Matter



Different formula

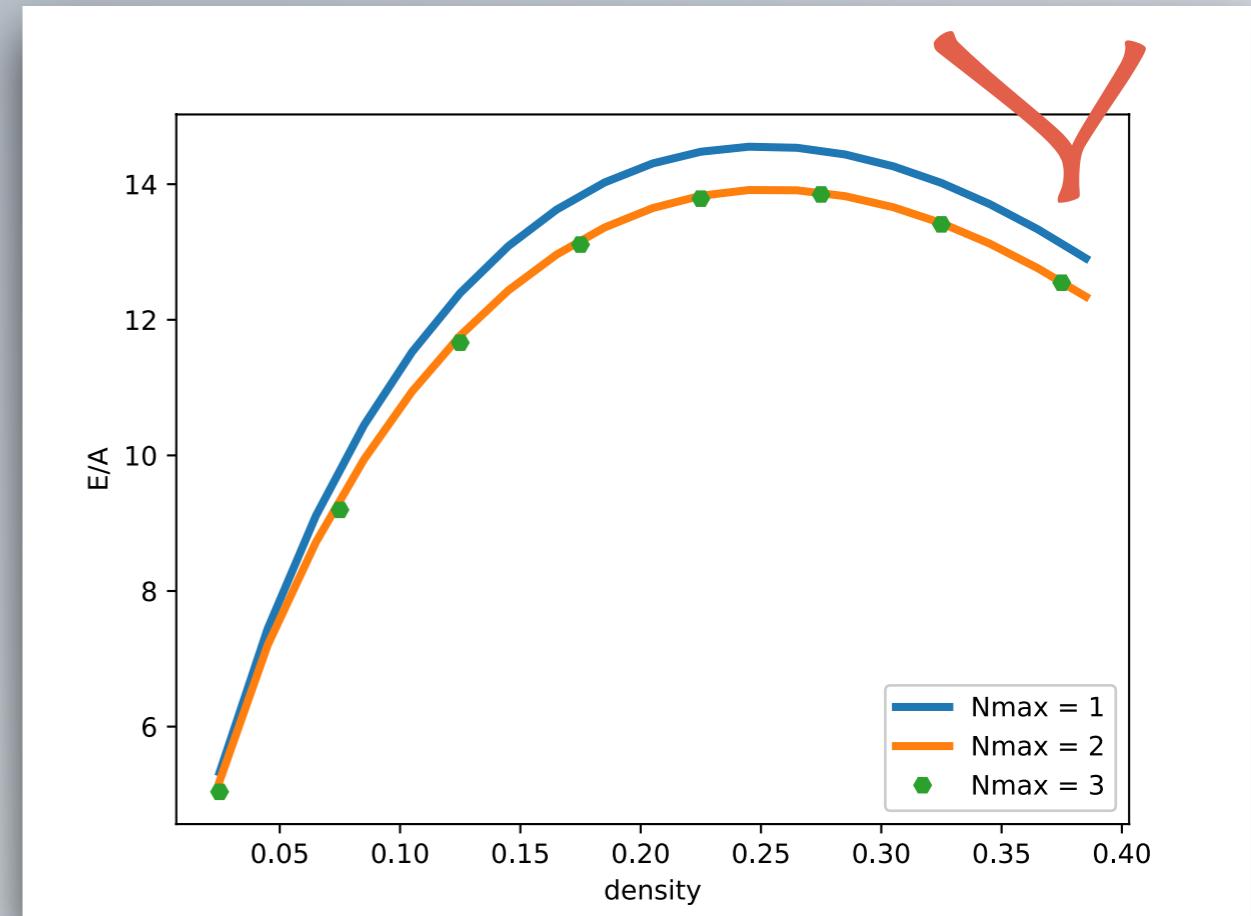
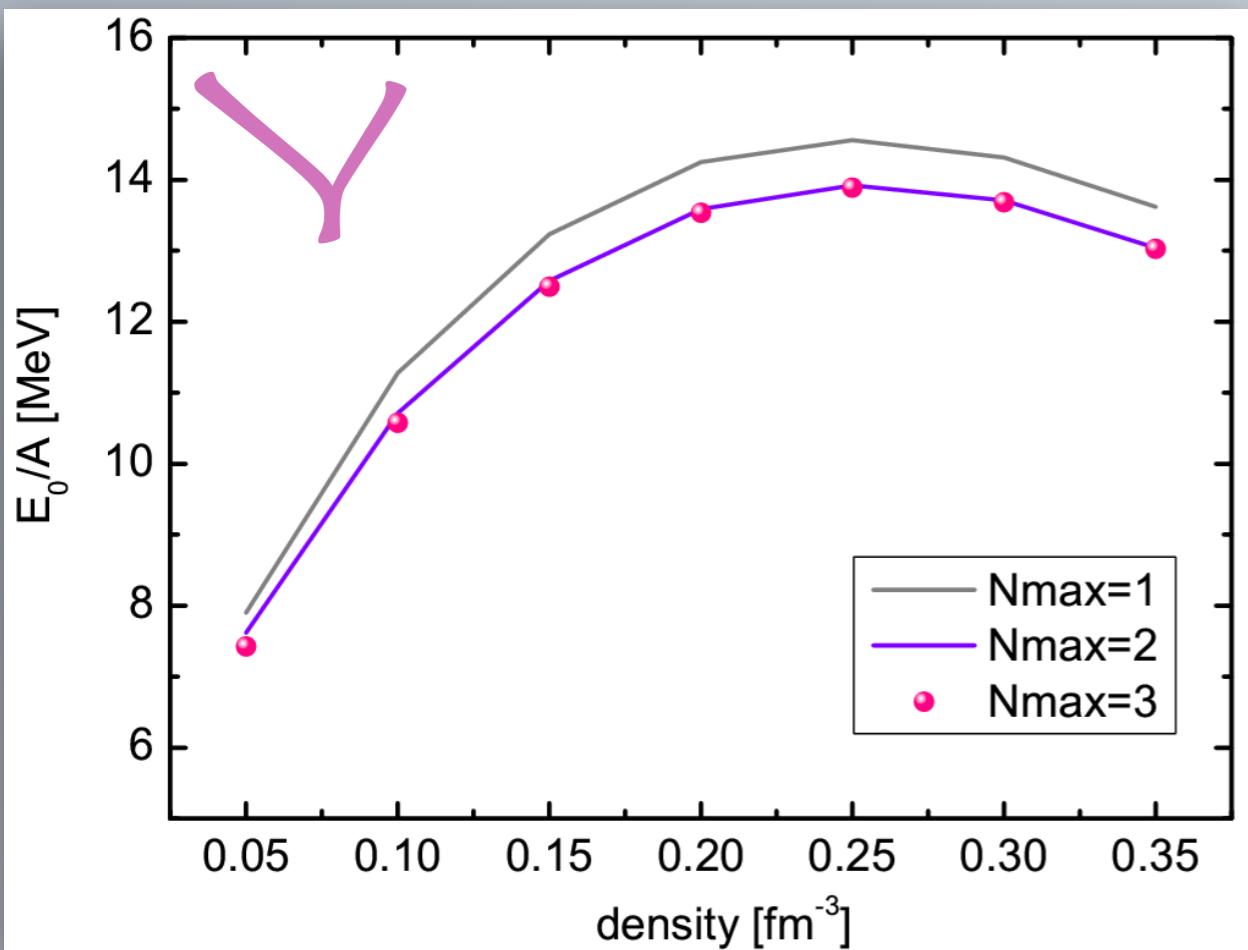
$$H_{ij}^{ab} = \langle ab|V|ij\rangle + P(ab) \sum_c f_c^b t_{ij}^{ac} - P(ij) \sum_k f_j^k t_{ik}^{ab}$$
$$+ \frac{1}{2} \sum_{cd} \langle ab|V|cd\rangle t_{ij}^{cd} + \frac{1}{2} \sum_{kl} \langle kl|V|ij\rangle t_{kl}^{ab}$$

$$H_{ij}^{ab} = \langle ab|V|ij\rangle + (\epsilon_a + \epsilon_b - \epsilon_i - \epsilon_j) t_{ij}^{ab}$$
$$+ \frac{1}{2} \sum_{cd} \langle ab|V|cd\rangle t_{ij}^{cd} + \frac{1}{2} \sum_{kl} \langle kl|V|ij\rangle t_{kl}^{ab}$$

Neutron Matter



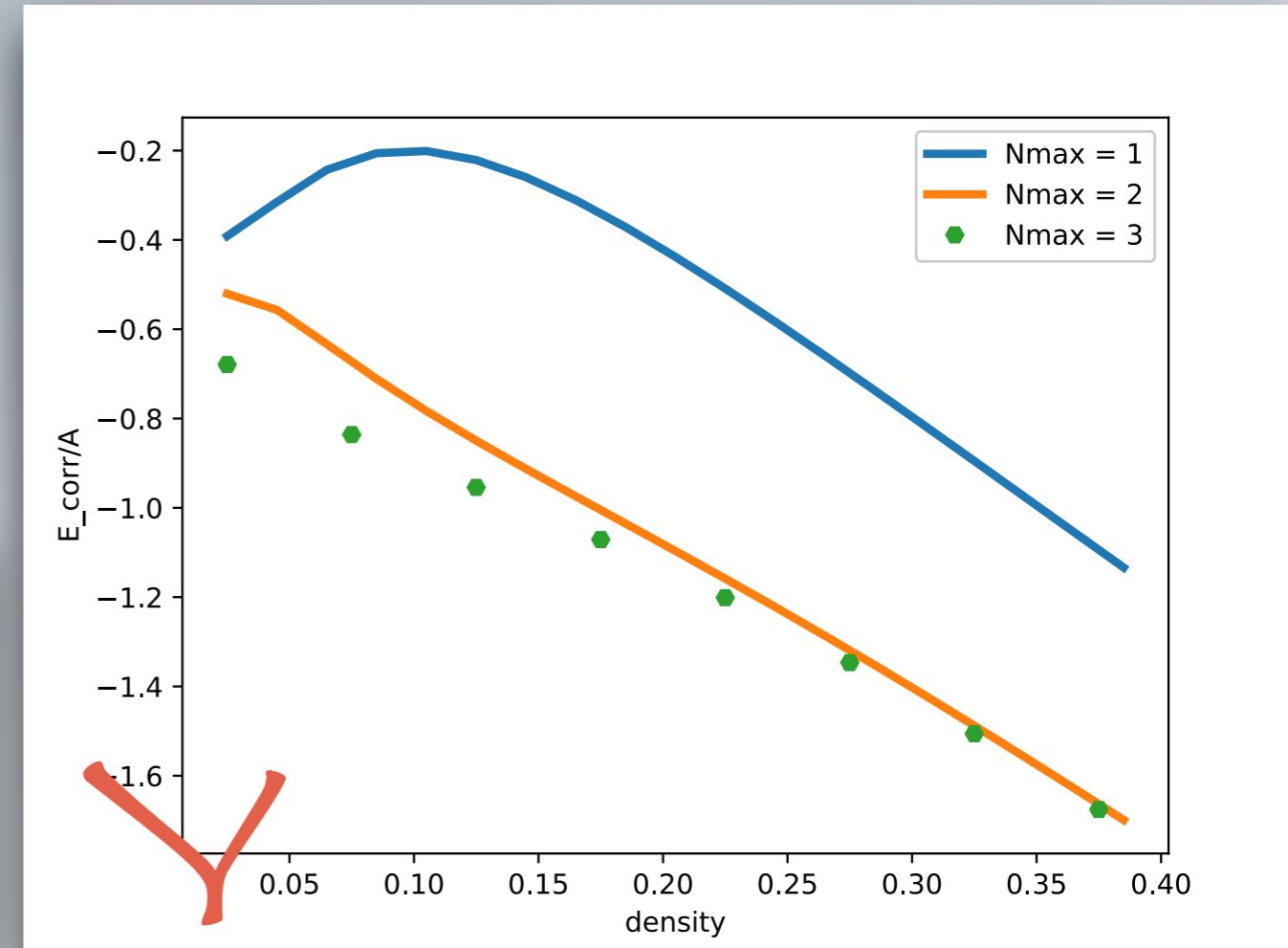
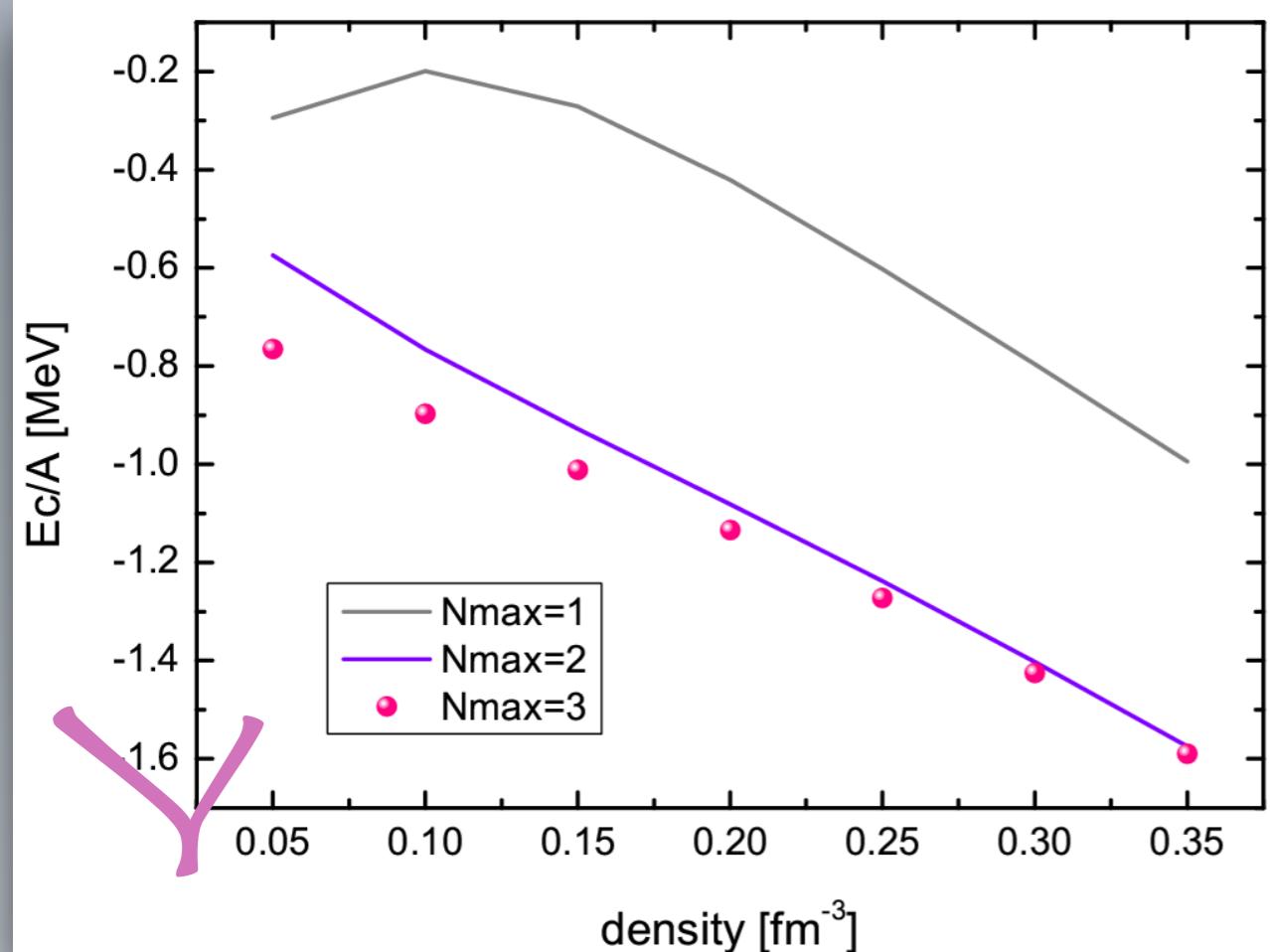
Total Energy per nuclei



Neutron Matter



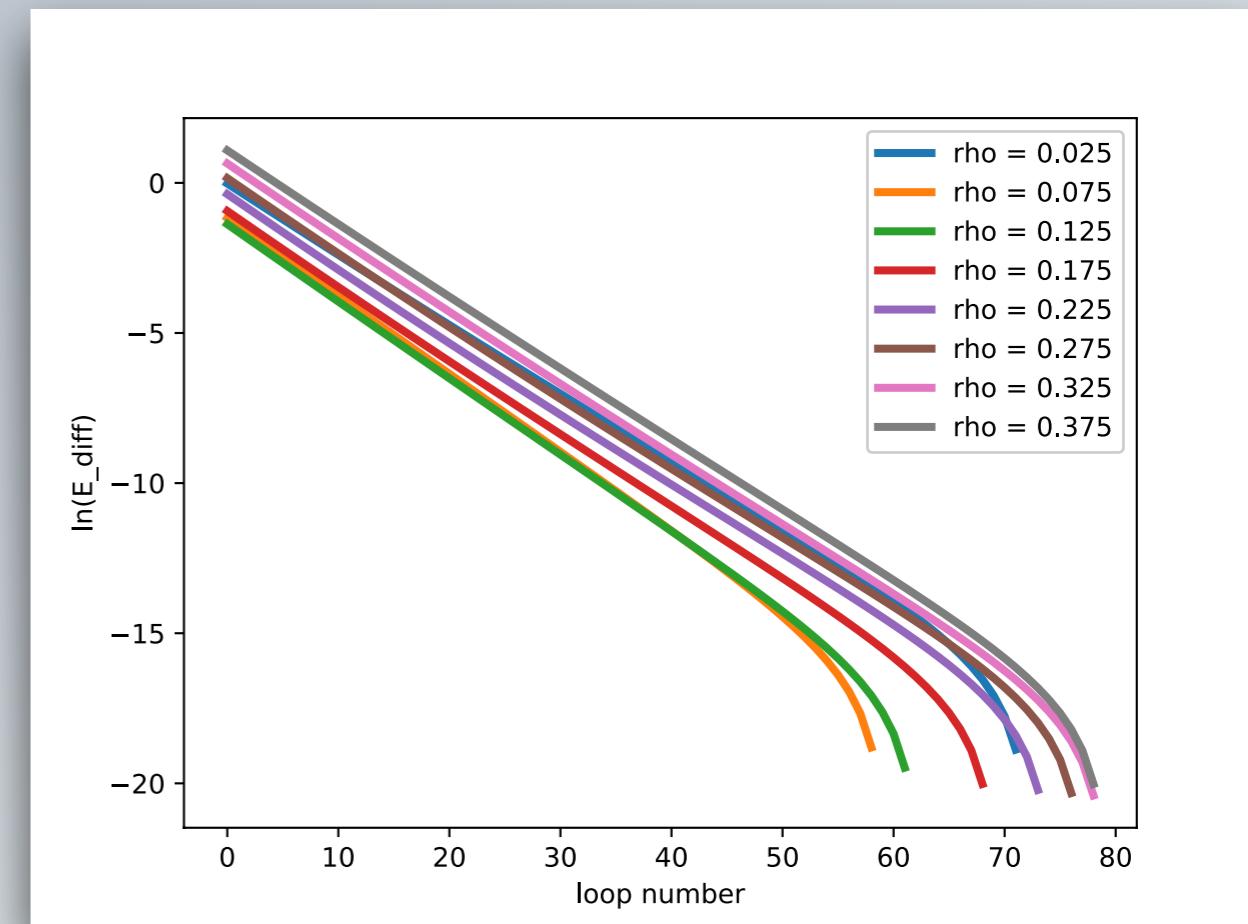
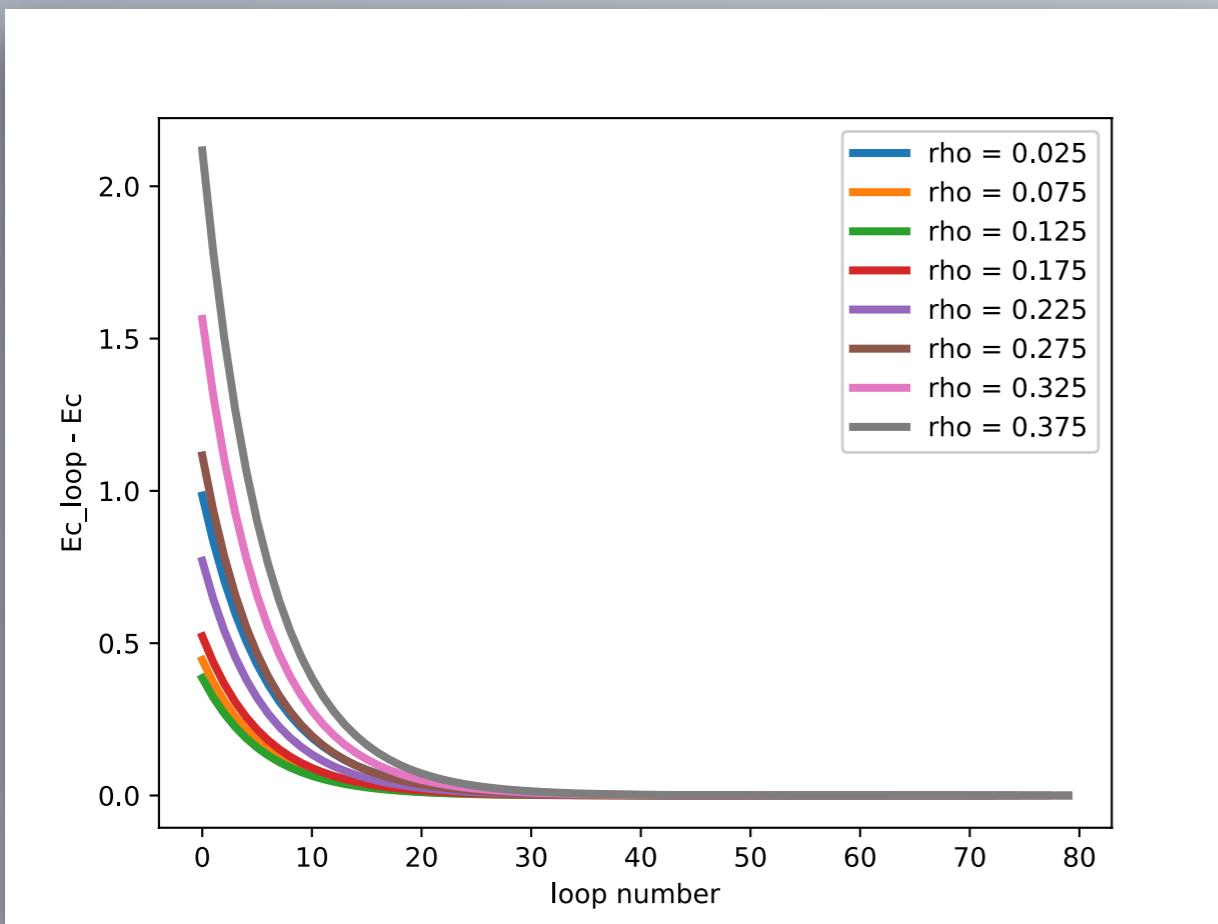
Correlation Energy per nuclei



Neutron Matter



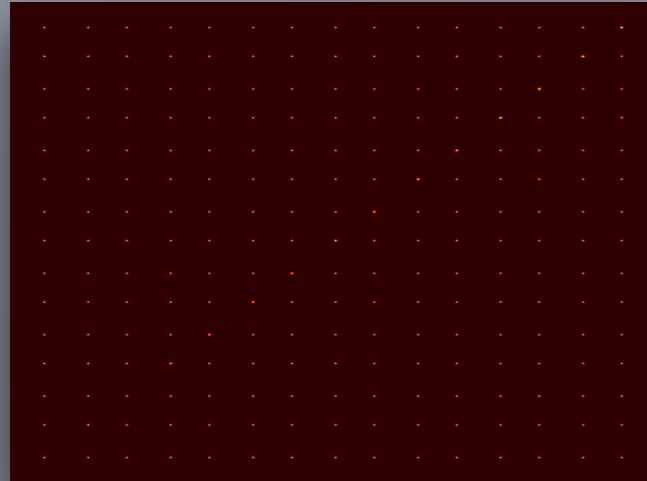
convergency



IMSRG very preliminary

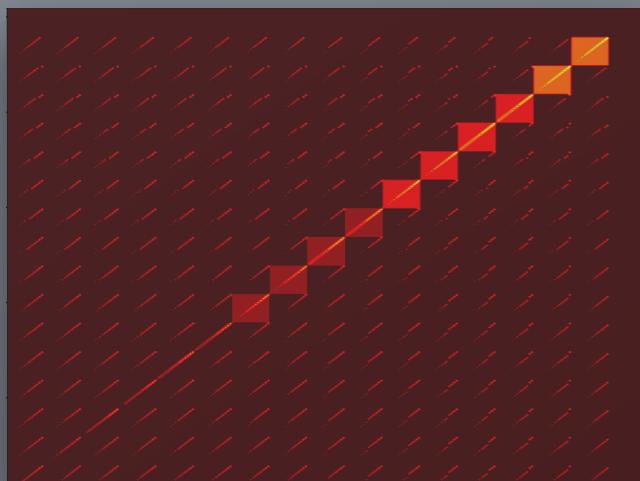


$$\Gamma_{ijkl} + \int d\Gamma_{ijkl}$$



$s = 0$

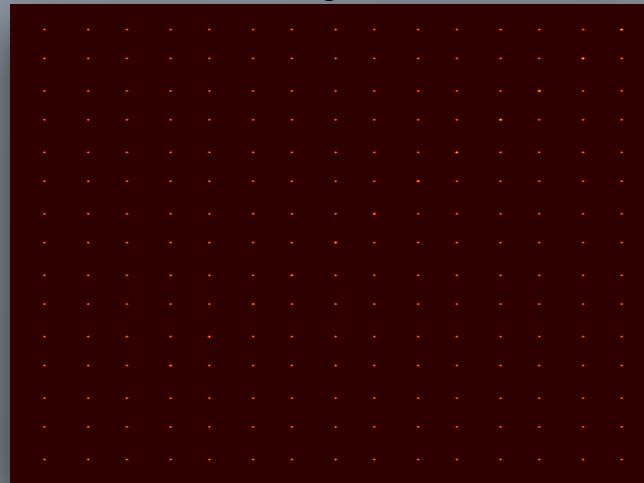
$$f_{ij} + \int df_{ij}$$



IMSRG very preliminary

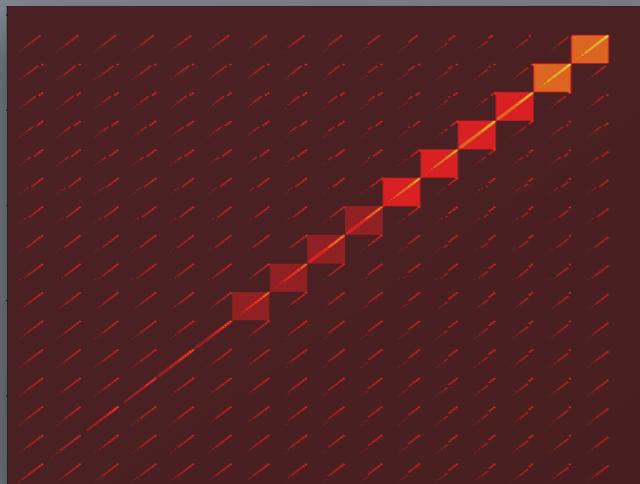


$$\Gamma_{ijkl} + \int d\Gamma_{ijkl}$$

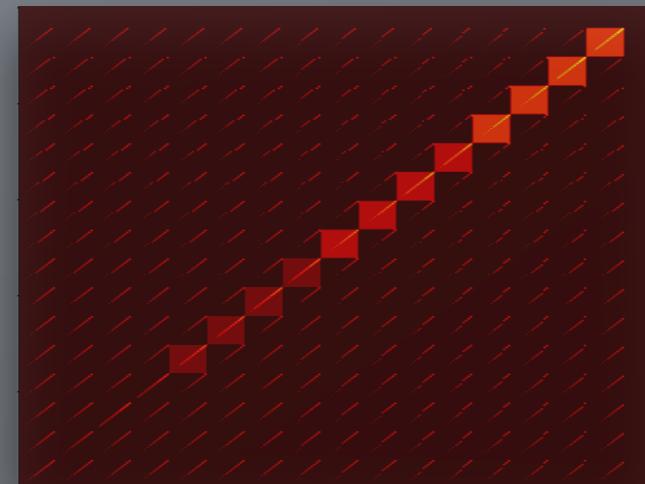


$s = 0$

$$f_{ij} + \int df_{ij}$$



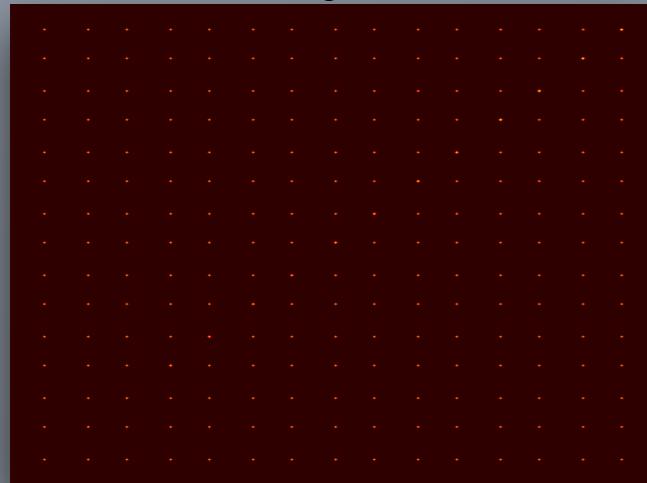
$s = 1$



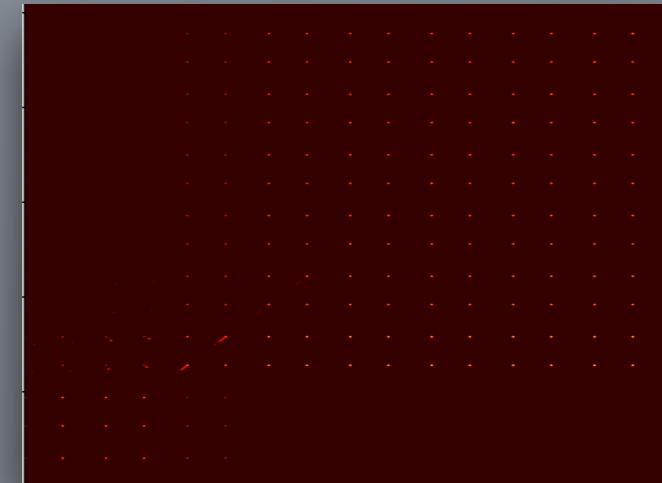
IMSRG very preliminary



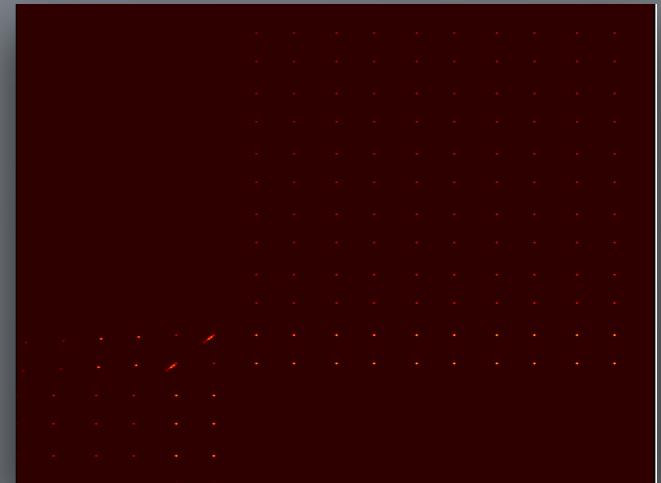
$$\Gamma_{ijkl} + \int d\Gamma_{ijkl}$$



$s = 0$

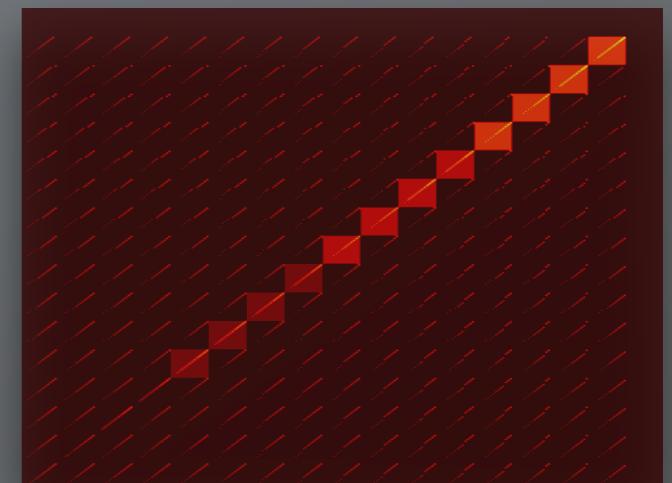
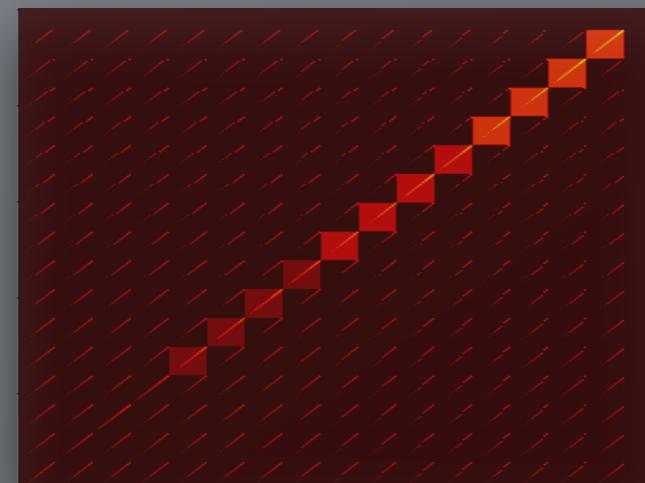
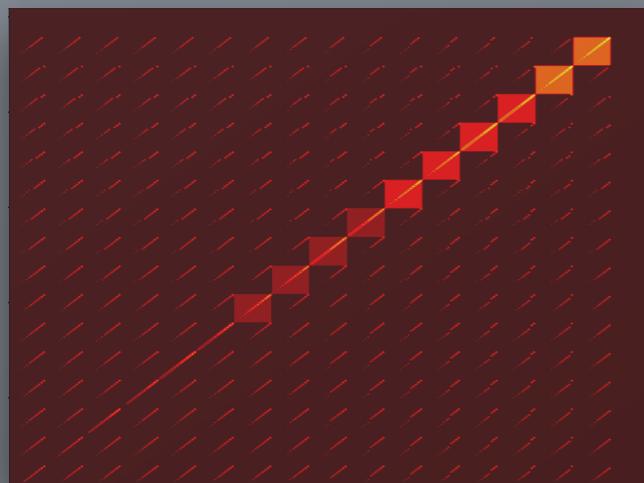


$s = 1$



$s = 20$

$$f_{ij} + \int df_{ij}$$



Many Many Thanks!

Group No.5

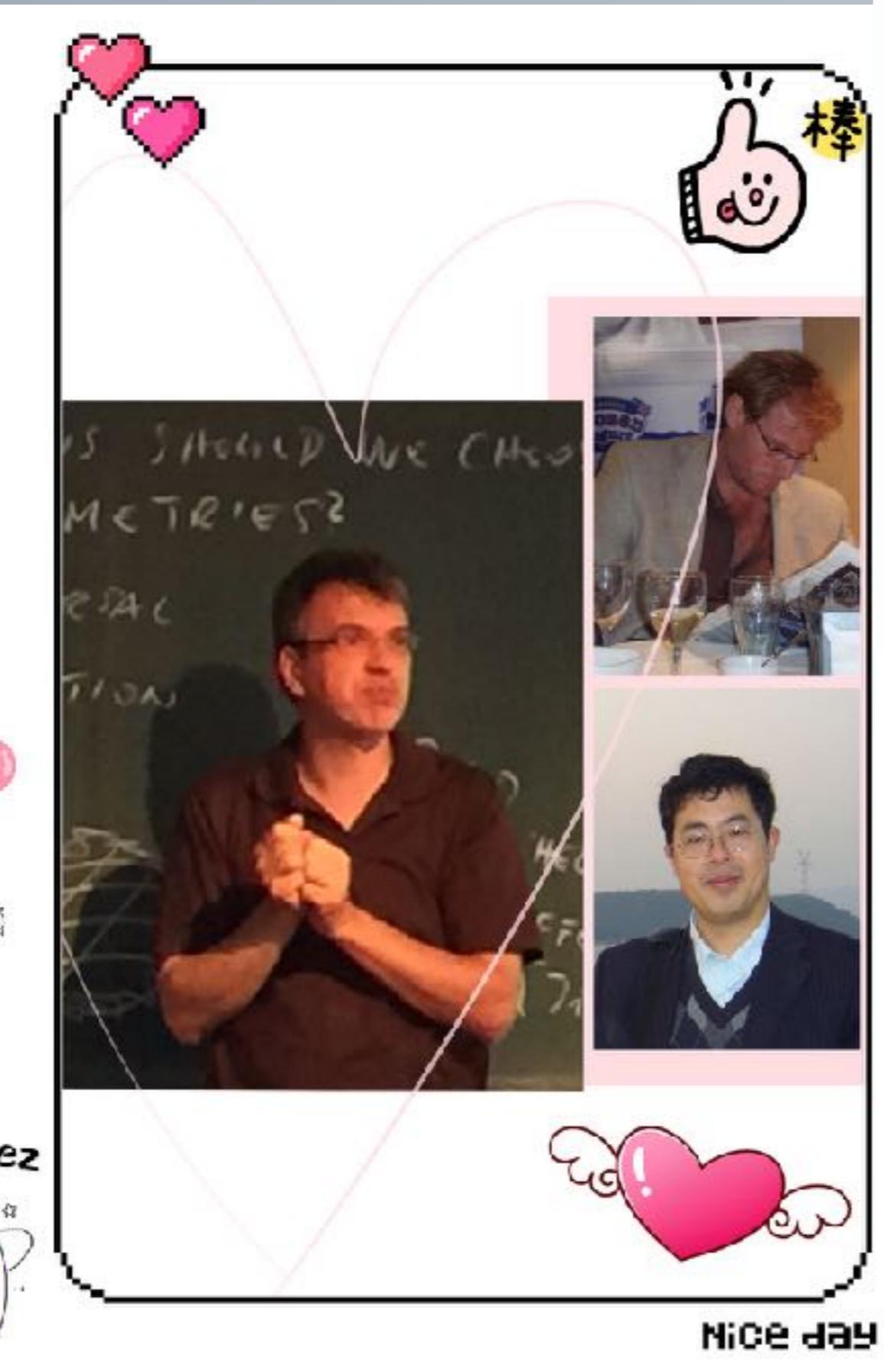
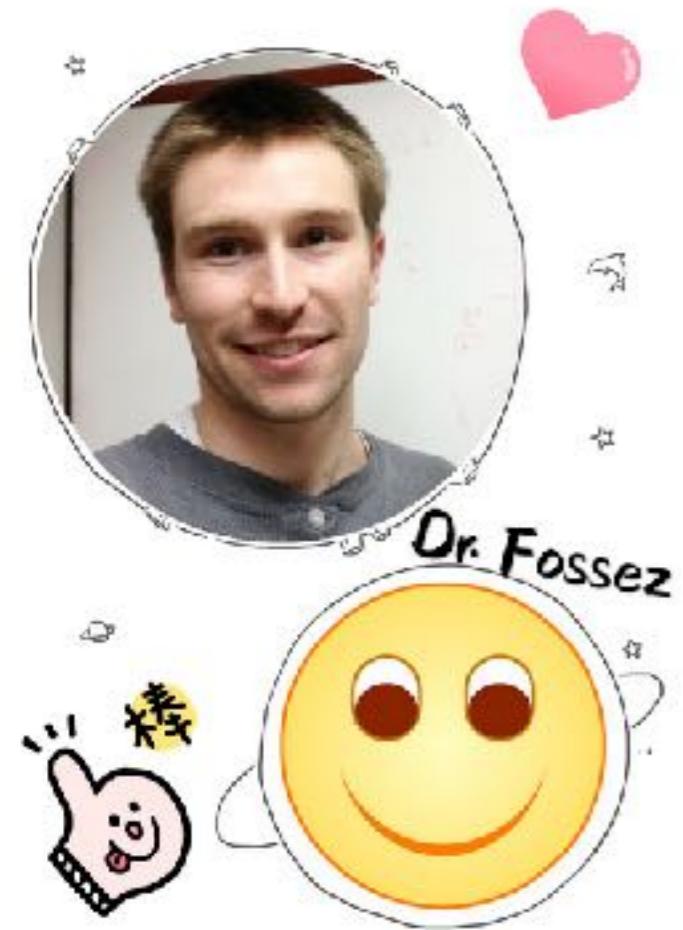
YIYUAN CHENG

ADAM VERNON

YUANZHUO MA



Many
Many



Many
Many
Thanks