Correlation Analysis Tool using the Schrödinger equation (CATS)

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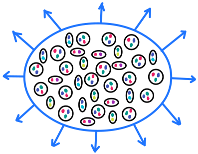
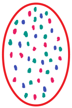
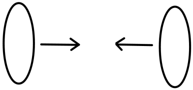
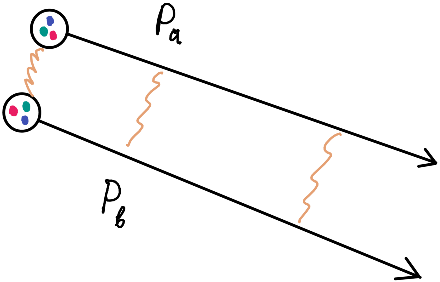
Emission source









Towards the detector

If the particles are close both in position and momentum space their interaction will change their final relative coordinates significantly.

The correlation function

$$C(k) = \frac{\mathcal{P}(\vec{p}_a, \vec{p}_b)}{\mathcal{P}(\vec{p}_a)\mathcal{P}(\vec{p}_b)} = \int \underbrace{S(\vec{r}, k)}_{\text{source}} \underbrace{\left|\Psi(\vec{r}, k)\right|^2}_{\substack{\text{2-particle} \\ \text{wave function}}} \mathrm{d}\vec{r} \xrightarrow{k\to\infty} 1$$

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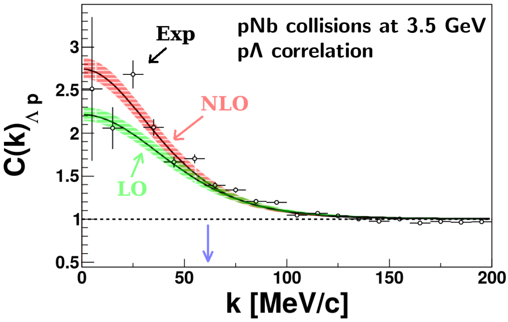
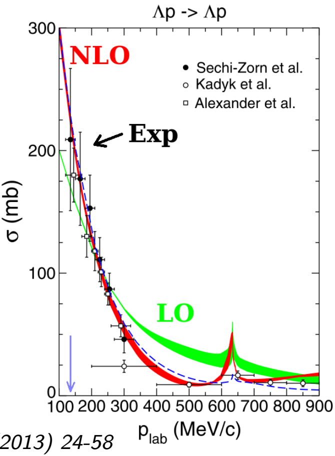
Phys. Rev. C 94, 025201



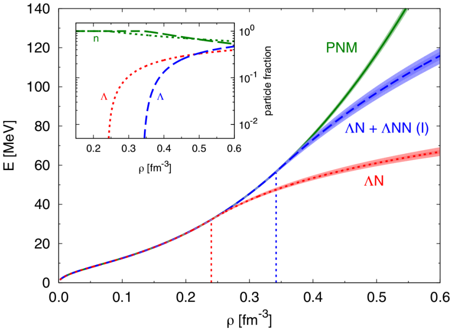


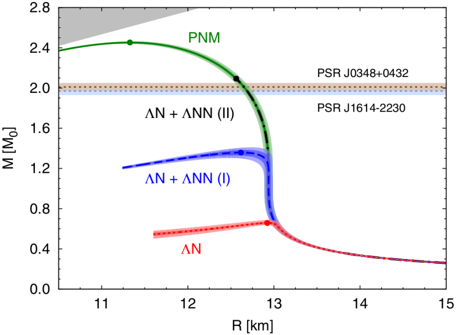
Nucl.Phys. A915 (2013) 24-58

Relation to neutron stars

NY interactions are important to understand the equation of state (EOS).

E.g. EOS is related to the mass-radius relation in neutron stars.

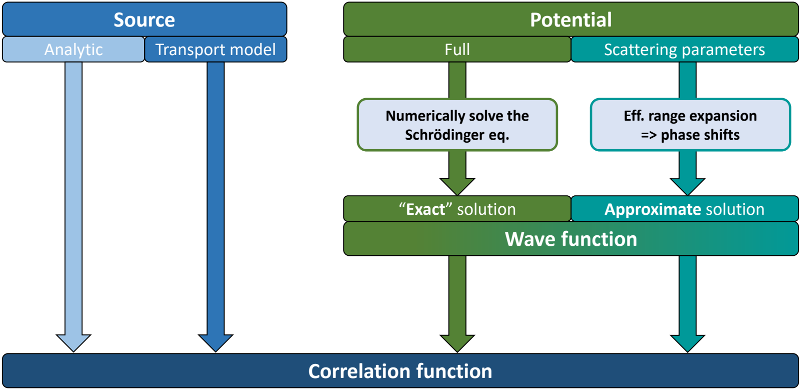




Phys.Rev.Lett. 114 (2015) no.9, 092301

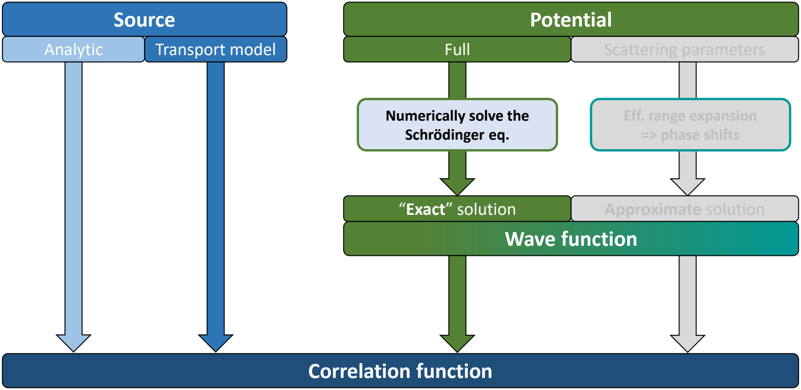
Workflow

$$C(k) = \frac{\mathcal{P}(\vec{p}_a, \vec{p}_b)}{\mathcal{P}(\vec{p}_a)\mathcal{P}(\vec{p}_b)} = \int \underbrace{S(\vec{r})}_{\text{source}} \underbrace{\left|\Psi(\vec{r}, k)\right|^2}_{\substack{\text{2-particle} \\ \text{wave function}}} \mathrm{d}\vec{r} \xrightarrow{k\to\infty} 1$$



Motivation - CATS

$$C(k) = \frac{\mathcal{P}(\vec{p}_a, \vec{p}_b)}{\mathcal{P}(\vec{p}_a)\mathcal{P}(\vec{p}_b)} = \int \underbrace{S(\vec{r})}_{\text{source}} \underbrace{\left|\Psi(\vec{r}, k)\right|^2}_{\text{2-particle wave function}} \mathrm{d}\vec{r} \xrightarrow{k\to\infty} 1$$



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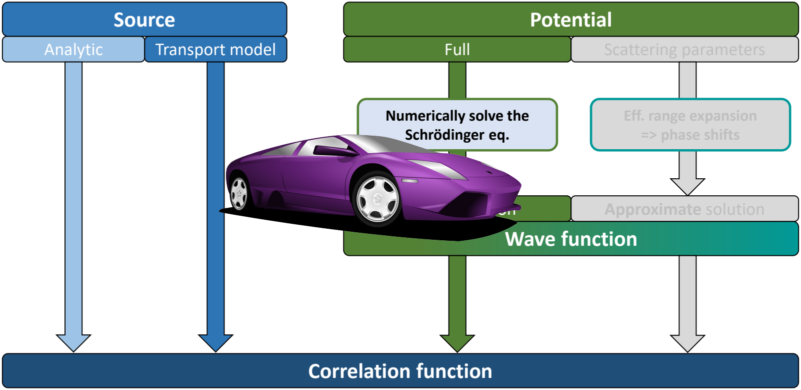

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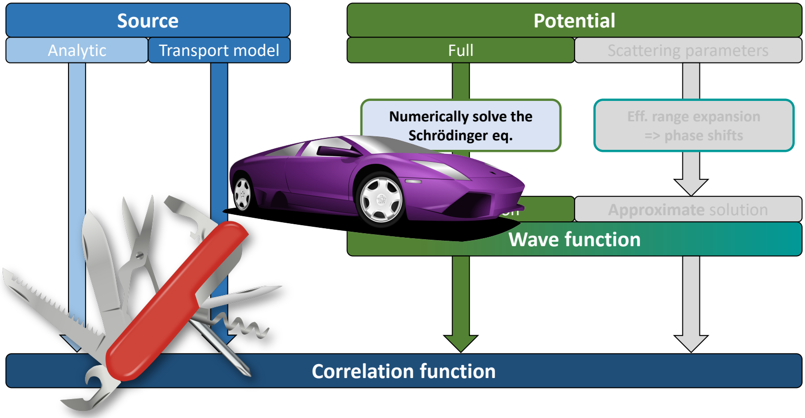
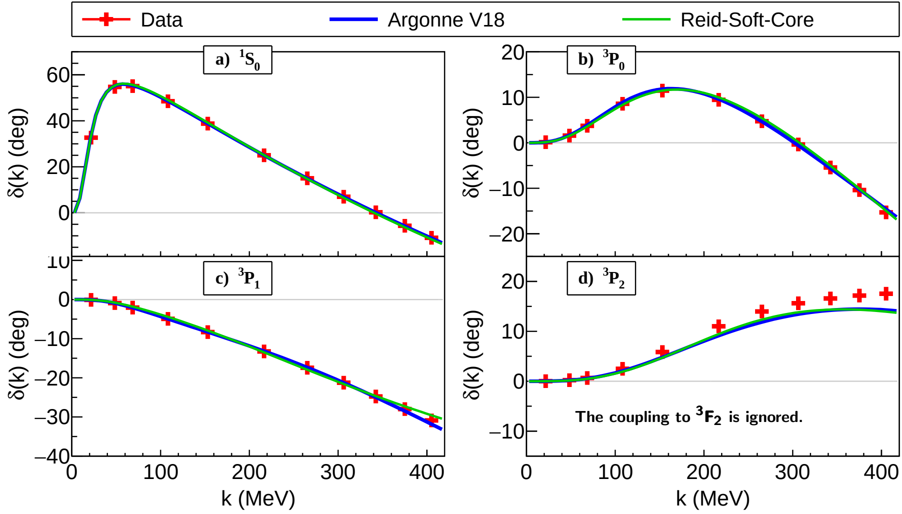


Let's chat by the poster!

Munich, Germany

The phase shifts of the pp channels



Argonne V18 potential and data: *Phys. Rev. C 51, 38*