QUARK MATTER 2015
Sep. 27 – Oct. 3, 2015 Kobe, Japan

Contribution ID: **120** Type: **Poster**

$\Lambda - \Lambda$ Correlation in High Energy Heavy Ion Collisions

Tuesday 29 September 2015 16:30 (2 hours)

We show that $\Lambda\Lambda$ intensity correlation function $C(Q = k_1 - k_2)$ measured in high energy heavy ion collisions can constrain the interaction between two Λ [1].

For various $\Lambda\Lambda$ interaction potentials in literature, summarized in the figure with corresponding low energy scattering parameters, we compute the $\Lambda\Lambda$ relative wave function $\Psi(x_1, x_2; Q)$ by assuming modification of the wave function in $S-$wave and discuss the relation between the scattering parameters and the behavior of the correlation function
$C(Q, K) = \frac{\int dx_1 \int dx_2 S(x_1, K) S(x_2, K) |\Psi(x_1, x_2; Q)|^2}{\int dx_1 S(x_1, k_1) \int dx_2 S(x_2, k_2)}$,
where $S(x, K)$ denote the source function which is the phase space distribution of Λ at freeze-out.

Employing a Gaussian source model with longitudinal and transverse expansion as a source function of Λ, we discuss the parameter ranges of the scattering length a_0 and the effective range r_{eff} constrained from experimental data in Au+Au collisions at $\sqrt{s_{NN}} = 200$GeV measured by the STAR collaboration [2]. The contribution from electromagnetic decay $\Sigma^0 \to \Lambda\gamma$ is found to be important. We also point out the existence of residual correlation in the high Q region which cannot be explained in the present framework.

Consequently, we obtained a constraint on the scattering length $1/a_0 < -0.8\text{fm}^{-1}$.
We will also address an application of this method to other systems, such as $\Omega - N$ [3].

1. K.Morita, T.Furumoto, A.Ohnishi, Phys. Rev. C **91**, 024916 (2015).
2. L.Adamczyk et al. (STAR Collaboration), Phys. Rev. Lett. **114**, 022301 (2015).
3. K.Morita, A.Ohnishi, T.Hatsuda, work in progress.

Indico rendering error

```
Could not include image: [403] Error fetching image
```

Author: MORITA, Kenji (Kyoto University)

Co-authors: OHNISHI, Akira (Kyoto University); FURUMOTO, Takenori (Ichinoseki College)

Presenter: MORITA, Kenji (Kyoto University)

Session Classification: Poster Session

Track Classification: Open Heavy Flavors and Strangeness