Zimanyi School 2025

Study of baryon-antibaryon interactions with the femtoscopy method

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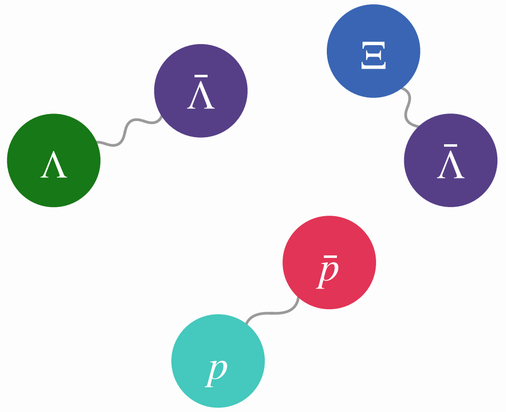
Femtoscopy in studies of baryon—antibaryon interactions



strong interactions

anihilation processes

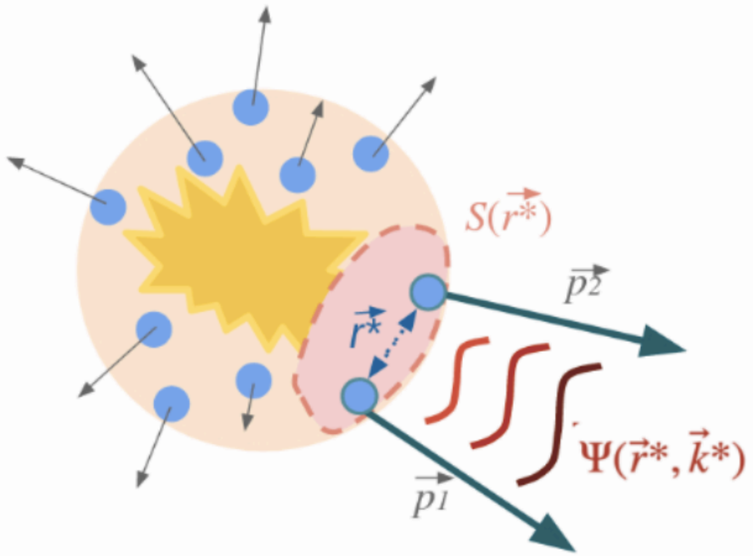
bound states

f_0 - *scattering length* $\left(\Re f_0, \Im f_0\right)$

d_0 - *effective potential length*

How can we study those interactions?

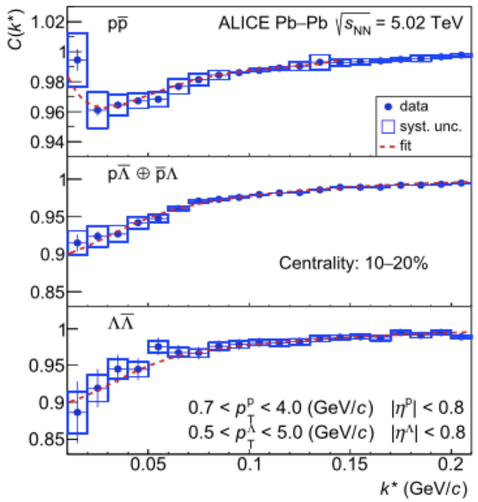
Femtoscopy - study of two-particle correlations at low relative momentum



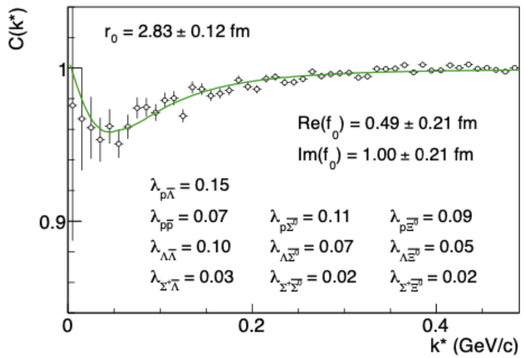
Source: Wioleta Rzęsa, PhD thesis

Examples of femtoscopy use in previous bearyon-antibaryon studies:

ALICE Collaboration, Physics Letters B 802 (2020) 135223



A. Kisiel et. al., Phys. Rev. C 89, 054916 (2014) ($p\bar{\Lambda}$)



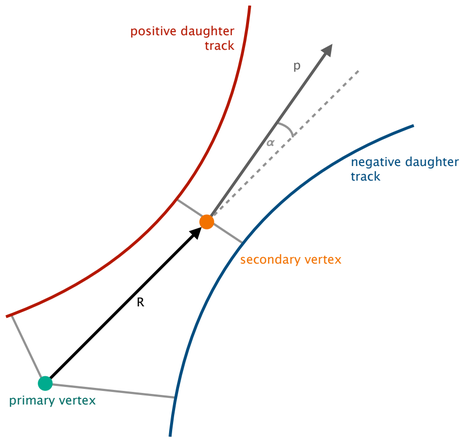
Future studies at

Warsaw University of Technology

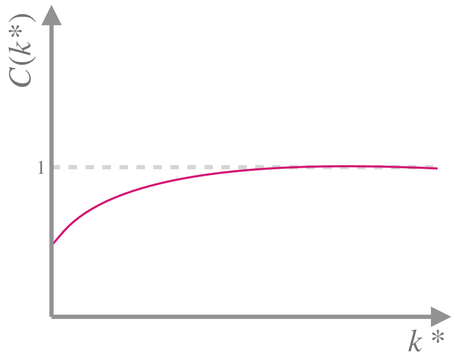
Faculty of Physics

Femtoscopy in studies of baryon—antybarion interactions

1. Reconstruction and selection



2. Defining correlation function and treating background

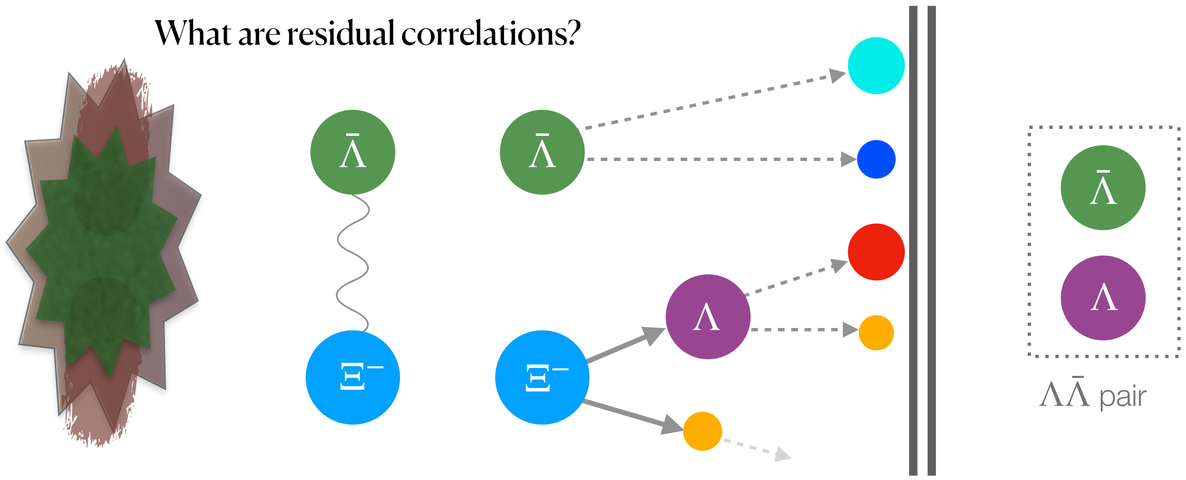


3. Fitting with Lednicky-Luboshitz model

with multiple considerations and challenges

$$C(k^*) = 1 + \sum_\sigma \rho_\sigma \left[\frac{1}{2} \left| \frac{f(k^*)}{R} \right|^2 \left(1 - \frac{d_0^\sigma}{2\sqrt{\pi} R} \right) + \frac{2\Re f(k^*)}{\sqrt{\pi} R} F_1(2k^* R) - \frac{\Im f(k^*)}{R} F_2(2k^* R) \right.$$

What are residual correlations?



1. collision
2. produced particles interaction
3. decays
4. detection and reconstruction

Presented poster describes steps in this analysis process.

Thank you :)