

# $\sigma$ -Channel Threshold Enhancement in Double-Pionic Fusion\*

Friday, 12 October 2007 10:20 (20 minutes)

## Summary

The observed invariant mass and angular distributions reveal the ABC-effect to be a  $\sigma$  channel phenomenon associated with the formation of a  $\Delta\Delta$  system in the intermediate state. The most pronounced feature is the enormous low-mass enhancement in the observed  $\pi^0\pi^0$  invariant mass distributions, which in the  $\pi^0\pi^0$  channel is larger than in the  $\pi^+\pi^-$  channel, since the latter also contains isovector contributions [Bash]. In contrast to previous inclusive measurements and theoretical predictions we observe no high-mass enhancement.

The differential distributions for the  $\pi^0\pi^0$  channels can be well described, if a strong attraction between two  $\Delta$ s in the intermediate state or even a bound  $\Delta\Delta$  system is assumed. Such a boundstate situation had been predicted previously [Oka,Wang]. This ansatz is capable of describing also the results of previous inclusive measurements on  $^4\text{He}$  as well as the resonance-like energy dependence of the total cross sections. The latter are in favor of a substantial binding between the two  $\Delta$ s.

- supported by BMBF, DFG (Europ. Graduate School) and COSY-FFE

[Bash]

M. Bashkanov et al.,  
Phys. Lett. **B637** (2006) 223.

[Oka]

M. Oka, K. Yazaki, Prog. Theor. Phys. **66** (1981) 572; J. Ping et al., Phys. Rev. **C64** (2002) 044003

[Wang] J. Ping, H. Pang, F. Wang, T. Goldmann, Phys. Rev. **C64**,

044003 (2002) and references therein

**Primary author:** BASHKANOV, Mikhail (Tuebingen University)

**Co-authors:** Ms PRICKING, Annette (Tuebingen University); Mr KREN, Florian (Tuebingen University); Prof. WAGNER, Gerhard (Tuebingen University); Prof. CLEMENT, Heinz (Tuebingen University); Mrs KHAKIMOVA, Olena (Tuebingen University); Ms SKORODKO, Tatiana (Tuebingen University)

**Presenter:** BASHKANOV, Mikhail (Tuebingen University)

**Session Classification:** Baryon Spectroscopy

**Track Classification:** Baryon Spectroscopy