

Excitation of the Roper Resonance in Single and Double-Pion Production *

Friday, 12 October 2007 10:40 (20 minutes)

Summary

The Roper resonance has been a puzzle ever since its detection in πN phase shifts. In most investigations no apparent resonance signatures could be found in the observables. Not only its nature has been a matter of permanent debate, also its resonance parameters show a big scatter in their values.

In the $pp \rightarrow n\pi^+$ reaction measured at CELSIUS-WASA at several energies a pronounced resonance structure at $M_{n\pi^+} \approx 1350$ MeV with $\Gamma \approx 140$ MeV has been found. These numbers agree very favourably with recent SAID πN phase shift results for the Roper pole as well as with the very recent BES results from $J/\psi \rightarrow N\bar{N}$. *With the pole position being roughly 100 MeV below the previously believed value of the $N(1440)$, also its decay branchings (defined at the pole position) change dramatically. From near-threshold two-pion production, when Roper excitation is the only significant process, we find the decay $N \rightarrow N\sigma$ to be the by far dominant process pointing to a breathing*

mode nature of the Roper resonance. supported by BMBF (06 TU 261), DFG (Europ. Grad. School), COSY-FFE

Primary author: SKORODKO, Tatiana (Tuebingen University)

Co-authors: Dr DOROSHKEVICH, Evgueni (Tuebingen University); Mr KREN, Florian (Tuebingen University); Prof. WAGNER, Gerhard (Tuebingen University); Prof. CLEMENT, Heinz (Tuebingen University); Dr BASHKANOV, Mikhail (Tuebingen University); Dr KASKULOV, Murat (Giessen University); Mrs KHAKIMOVA, Olena (Tuebingen University)

Presenter: SKORODKO, Tatiana (Tuebingen University)

Session Classification: Baryon Spectroscopy

Track Classification: Baryon Spectroscopy