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The BGOOD experiment at ELSA - exotic structure in the light quark sector?

The recent discoveries of the pentaquark, P_C, states and XYZ mesons in the charmed quark sector has initiated a new epoch in hadron physics. The existence of exotic multi-quark states beyond the conventional three and two quark systems has been realised. Such states could manifest as single colour bound objects, or evolve from meson-baryon and meson-meson interactions, creating molecular like systems and re-scattering effects near production thresholds. Intriguingly, similar effects may be evidenced in the light, uds sector in meson photoproduction. Access to a low momentum exchange and forward meson production region is crucial. The BGOOD photoproduction experiment is uniquely designed to explore this kinematic region; it is comprised of a central calorimeter complemented by a magnetic spectrometer in forward directions.

Our results indicate a peak-like structure in the $\gamma n \to K^0\Sigma^0$ cross section at $W \sim 2$ GeV consistent with a meson-baryon interaction model which predicted the charmed P_C states. The same $K^*\Sigma$ molecular nature of this proposed N*(2030) is also supported in our measurement of $\gamma p \to K^+\Lambda(1405)(\to \pi^0\Sigma^0)$, where it is predicted to drive a triangle mechanism. Additionally, a sharp drop in the $\gamma p \to K^+\Sigma^0$ cross section at very forward angles at $W \sim 1.9$ GeV is observed.

In the non-strange sector, coherent meson photoproduction off the deuteron enables access to proposed dibaryon states, including the recently discovered $d^*(2380)$. Data will be presented which support recent experimental claims of higher mass isoscalar and isovector dibaryons.

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