

# The BGOOD experiment at ELSA - Multi quark structures in the light quark sector

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The discoveries of the pentaquark,  $P_C$ , states and  $XYZ$  mesons in the charmed quark sector initiated a new epoch in hadron physics. The existence of exotic multi-quark states beyond the conventional  $q\overline{q}$  and  $qqq$  systems has obviously 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. To study a molecular-like and spatially extended baryonic system access to a low momentum exchange and therefore 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.

BGOOD has a rich programme of strangeness photoproduction studies off both proton and neutron (deuterium) target. Recent highlights include a peak-like structure in the  $\gamma n \rightarrow K^0 \Sigma^0$  cross section at  $W \sim 2$  GeV consistent with a meson-baryon interaction model which predicted the charmed  $P_C$  states. The  $K^* \Sigma$  molecular nature of this proposed  $N^*(2030)$  is also supported in our measurement of  $\gamma p \rightarrow K^+ \Lambda(1405) (\rightarrow \pi^0 \Sigma^0)$ , where it is predicted to drive a triangle singularity mechanism.

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